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IN THE

Supreme Court of the United States

EML TECHNOLOGIES, LLC,
AND
COSTCO WHOLESALE CORPORATION,

Petitioners,

v.

DESA IP, LLC,

Respondent.

ON PETITION FOR A WRIT OF CERTIORARI TO THE
UNITED SATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

PETITION FOR A WRIT OF CERTIORARI

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QUESTIONS PRESENTED

Whether the Court of Appeals for the Federal Circuit should give deference to a district court's factual determinations when reviewing that court's claim construction.

RULE 29.6 STATEMENT

Petitioner EML Technologies, LLC is a privately-held limited liability company. Petitioner Costco Wholesale Corporation is a publicly-traded corporation. Neither petitioner has a parent company, and no publicly-traded corporation holds 10% or more of either petitioner's stock.

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OPINIONS BELOW

At the conclusion of a three-day evidentiary *Markman* hearing the district court gave an oral ruling on claim construction, which it affirmed in a subsequent written order. (App. 19a-41a, 42a-43a.) On the basis of that ruling, the parties stipulated to a judgment of non-infringement. (App. 14a-41a, SA13-SA34.) The opinion of the Court of Appeals for the Federal Circuit vacating the stipulated judgment was designated as a nonprecedential disposition. (App. 1a-13a.) That court denied rehearing without comment on the merits. (App. 123a-124a.)

JURISDICTION

The judgment of the court of appeals was entered on January 4, 2007. The order denying rehearing was entered on February 2, 2007. This Court's jurisdiction is invoked under 28 U.S.C. § 1254(1).

RULE INVOLVED

Federal Rule of Civil Procedure 52(a) states:

> In all actions tried upon the facts without a jury or with an advisory jury, the court shall find the facts specially and state separately its conclusions of law thereon . . . . Findings of fact, whether based on oral or documentary evidence, shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses.

STATEMENT

The issue raised in this petition is the deference that should be accorded to a district court's factual determinations when the district court construes the meaning of a patent claim. Under the present standard of *de novo* review, the Court of Appeals for the Federal Circuit gives no deference to a district court's factual findings. This is contrary to both this Court's statements in *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996) ("*Markman II*") and the plain meaning of Federal Rule of Civil Procedure 52(a).

In *Markman II*, this Court was faced with the question of whether the determination of the meaning of a patent claim was a matter for a jury or for the court to decide. The Court held that there is no Seventh Amendment right to a jury determination of the meaning of a patent claim and that "the construction of a patent, including terms of art within its claim, is exclusively within the province of the court." *Id.* at 372. Ultimately, the Court's decision turned on considerations as to the administration of justice:

> Where history and precedent provide no clear answers, functional considerations also play their part in the choice between judge and jury to define terms of art. We said in *Miller v. Fenton*, 474 U.S. 104, 114, 88 L. Ed. 2d 405, 106 S. Ct. 445 (1985), that when an issue "falls somewhere between a pristine legal standard and a simple historical fact, the fact/law distinction at times has turned on a determination that, as a matter of the sound administration of justice, one judicial actor is better positioned than another to decide the issue in question." So it turns out here, for judges, not juries, are the better suited to find the acquired meaning of patent terms.

Id. at 388.

In *Markman II*, the Court did not explicitly address the proper standard of review. However, the Court acknowledged that claim construction is a "mongrel practice" involving considerations of both fact and law. *Id.* at 378. Not only did this Court never suggest that a district court construing patent claims would make no factual determinations, to the contrary, the Court stated:

> We accordingly think there is sufficient reason to treat construction of terms of art like many other responsibilities that we cede to a judge in the normal course of trial, *notwithstanding its evidentiary underpinnings.*

Id. at 390, emphasis added.

Indeed, this Court not only allowed that evidence such as expert testimony might be considered by a district court in construing claims, it explicitly noted that a claim construction determination might turn entirely on a district court's weighing of the relative credibility of expert witnesses.

> It is, of course, true that credibility judgments have to be made about the experts who testify in patent cases, and in theory there could be a case in which a simple credibility judgment would suffice to choose between experts whose testimony was equally consistent with a patent's internal logic.

Id. at 389.

Having acknowledged that factual findings, including credibility determinations, are part of the claim construction process, it necessarily follows that Federal Rule of Civil Procedure 52(a) applies, and that findings of fact made by the district court can not be set aside unless clearly erroneous.

In the wake of *Markman II*, and despite the Federal Circuit's earlier ruling in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995) ("*Markman I*") that a district court's claim construction is reviewable *de novo*, certain judges of the Federal Circuit correctly seized on this Court's statements in *Markman I* to continue to give deference to the factual findings of the district court. *See, e.g., Metaullics Sys. Co. v. Cooper*, 100 F.3d 938, 939 (Fed. Cir. 1996); *Wiener v. NEC Elecs., Inc.*, 102 F.3d 534, 539 (Fed. Cir. 1996); *Serrano v. Telular Corp.*, 111 F.3d 1578, 1586 (Fed. Cir. 1997); *Eastman Kodak Co. v. Goodyear Tire & Rubber Co.*, 114 F.3d 1547, 1555-56 (Fed. Cir. 1997).

Deference to the factual findings of a district court is not only consistent with this Court's decision in *Markman II* and with Federal Rule of Civil Procedure 52(a), it accords with the practical realities of a patent case. A patent is not only a legal document, it is a technical document. The district court is required to examine the claims from the perspective of "what one of ordinary skill in the art at the time of the invention would have understood the term to mean." *Markman I*, 52 F.3d at 986. The level of skill and the understanding of one of skill are inherently factual issues. As Judges Mayer and Newman later explained in their dissent in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1332 (Fed. Cir. 2005) (*en banc*), *cert. denied*, 546 U.S. 1170 (2006):

> Claim construction is, or should be, made in context: a claim should be interpreted both from the perspective of one of ordinary skill in the art and in view of the state of the art at the time of invention. *See Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1477 (Fed. Cir. 1998) ("It is the person of ordinary skill in the field of the invention through whose eyes the claims are construed."). These questions, which are critical to the correct interpretation of a claim, are inherently factual. They

> are hotly contested by the parties, not by resort to case law as one would expect for legal issues, but based on testimony and documentary evidence.

However, in *Cybor Corp. v. FAS Techs.*, 138 F.3d 1448 (Fed. Cir. 1998) (*en banc*), the Federal Circuit held that "as a purely legal question" claim construction is reviewable "*de novo* on appeal including any allegedly fact-based questions relating to claim construction," and expressly disavowed any contrary authority. *Id.* at 1456. Respectfully, the Federal Circuit's decision in *Cybor* that claim construction is a "purely legal question" is not in accord with this Court's statements in *Markman II*, and once it is acknowledged that a district court makes factual determinations in the course of claim construction, Federal Rule of Civil Procedure 52(a) mandates that such findings shall not be set aside except for clear error.

The *Cybor de novo* review rule has been soundly and repeatedly criticized by legal scholars as well as by a number of judges on the Federal Circuit itself. It has led to a variety of unintended consequences that have impeded rather than assisted in the resolution of patent cases. And, as in this case, the failure to give deference to the factual findings of a district court can lead to manifest injustice. Here, a district court reached a careful and correct understanding of the proper scope of the patent claims at issue after extensive briefing and testimony which allowed the district court to evaluate the claims from the perspective of one of skill in the art. The Federal Circuit, reviewing the issue under its *Cybor de novo* rule, ignored the district court's factual determinations, ignored the expert testimony, and ordered a different claim construction that is simply wrong as a matter of science. A cold record is not an adequate substitute for live testimony when it comes to making factual determinations, and a pretense that claim construction is a purely legal issue cannot be reconciled with the fact that a patent is also a technical document and that it must as a matter

of law be interpreted from the perspective of one of skill in the art. It is time for this Court to address the problem of purely *de novo* review of claim construction and rule that appropriate deference is to be given to the factual findings of district courts, in conformity with the historical role of those courts and Federal Rule of Civil Procedure 52(a).

A. Factual Background

DESA IP, LLC filed suit against EML Technologies LLC and Costco Wholesale Corporation in the Middle District of Tennessee on February 27, 2004. DESA alleged infringement of U.S. Patent No. 5,598,066 ("the '066 patent") titled "Two-Level Security Lighting System." (App. SA1-SA12.) As characterized by the Federal Circuit:

> The '066 patent discloses a light that illuminates at two levels: (1) a dim "accent" level when dusk is detected by a photocell within the apparatus and (2) a brighter "security level which is rapidly activated when motion is detected by a passive infrared motion sensor. The lamp remains illuminated at the "security" level as long as the motion sensor continues to detect motion (which resets an internal timer), but eventually returns to "accent" mode. When the photocell senses daylight, however, the lamp is turned off.

(App. 2a.)

The district court received and considered extensive briefing regarding the technology at issue and claim construction, and had the assistance of a court-appointed expert, Dr. Charles Carnal, a professor of electrical engineering at Tennessee Technological University. The district court conducted a three-day *Markman* hearing from October 25-27, 2005, in which the

court heard testimony from five technical experts and two patent experts and observed technical demonstrations presented by both parties. The district court and the court's expert posed questions to counsel and the witnesses and heard hours of opening statements and closing arguments. (*See, e,g*, App. 20a, 44a-64a, 65a-122a.)

At the end of the *Markman* hearing, on October 27, 2005, the district court orally gave its interpretation of the claims. (App. 19a-41a.) That interpretation comported with scientific facts and was informed by how one of skill in the art would understand and interpret the claim language. Based on the district court's claim construction, DESA stipulated to judgment of non-infringement. The Federal Circuit, on appeal, reached a different and much broader claim construction, reversed the judgment of non-infringement and remanded.

B. The Errors In The Federal Circuit's Claim Construction Ruling

Petitioners respectfully submit that the Federal Circuit's claim construction is fundamentally flawed. The Federal Circuit's disregard under its standard of *de novo* review of the district court's factual determinations led the Federal Circuit to a claim construction at odds with the underlying science. The district court was well informed as to that science. The district court had the benefit of a court-appointed technical advisor, expert testimony and actual demonstrations of the technology. The district court was thus in a superior position to construe the claims in a manner consistent with the standard; *i.e.*, from the perspective of one of skill in the art. The errors in the Federal Circuit's claim construction are a perfect illustration of why deference should be given to the district court's underlying factual determinations.

1. The Disputed Construction

The key disputed term is "sensor means." The district court construed this term as a mean-plus-function element under 35 U.S.C. § 112, ¶ 6. The Federal Circuit agreed. The district court determined that the sensors in the specification that carried out the claimed function in the disputed claims included passive infrared sensors (PIRs) and "selection circuitry" such as a pulse counting function. The Federal Circuit disagreed, and found that the structure for "sensor means" was limited to the PIRs, and did not include the "selection circuitry." In so ruling, the Federal Circuit specifically rejected expert testimony to the contrary. (App. 10a-11a.)

Although the "sensor means" claim element is expressed in somewhat different language in the four independent claims where it appears, the parties agreed that it should be construed the same in every instance as, in essence, "sensor means [for detecting motion of a person or other object]." The Federal Circuit did not dispute this, and specifically noted as follows:

> The court found the corresponding structure for "first sensor means for detecting a first predetermined condition external to said apparatus" in claim 6 - where "first predetermined condition" was internally defined within claim 6 to be "*motion relative to said first sensor means of a person or object separate from said apparatus*" — described at col.3 l.24-col.4 l.5 of the specification.

(App. 6a, emphasis added.)

Thus, the structure must be capable of identifying the *motion* of a person or object *as distinguished from* mere temperature changes in stationary objects. A passive infrared sensor, as its name implies, senses changes in infrared radiation, *i.e.*,

temperature changes incident upon the sensor. While such changes can be caused by the motion of a person or other object moving past the sensor, such changes can also be caused by temperature changes in stationary objects (*e.g.*, brick buildings or swimming pools) within range of the sensor. In the patent specification, these PIRs are designated Q1 and Q2. The purpose and function of pulse counting selection circuitry in the patent is to distinguish PIR signals caused by motion from PIR signals caused by temperature changes in stationary objects. In the patent specification, this is shown as circuit 51 in Figures 2A and 2B, which depict the preferred embodiment.

Thus, the central dispute in regard to claim construction was whether the structure that performs the claimed function of detecting the *motion* of a person or other object consists of the PIRs alone, without the pulse counting circuit, or whether, as petitioners contend, the structure is the combination of the PIRs and at least a pulse counting circuit. The district court correctly found the structure to be the latter, while the Federal Circuit, in using *de novo* review, rejected the factual findings of the district court to find the former.

2. The Federal Circuit's Construction Is Contrary To Scientific Fact

Very simply, PIRs do not detect motion. This fact was explained to the district court through expert testimony and the demonstrations in the *Markman* hearing. To accomplish the motion-detecting function, other circuitry must be used in conjunction with the PIRs to select the signals caused by motion as opposed to those caused by mere temperature change. To select the right signals, the specification of the '066 patent teaches pulse count selection circuitry.

The district court correctly found that, pursuant to 35 U.S.C. § 112 ¶6, "sensor means [for detecting motion of a person or

other object]" should be construed to mean the passive infrared sensors Q1 and Q2 together with at least circuit element 51 ("pulse counting"), plus equivalents. The Federal Circuit disagreed with the district court — holding that the district court had relied upon extrinsic evidence contrary to the intrinsic evidence. (App. 10a.) In so holding, the Federal Circuit in effect chose to make its own factual findings and assumed that it was better able to evaluate what the claims and specification would mean to those of skill in the art than would those actually skilled in that art. It elected to ignore that the parties themselves had agreed that the "sensor means" were for detecting *motion* of a person or other object, something that PIRs by themselves cannot do. It elected to reject a claim construction that the district court had carefully made based on consultation with an independent technical expert, three days of live testimony from experts and live demonstrations of the technology. Reduced to its essence, the Federal Circuit, using *de novo* review, simply paid no heed to the facts found by the district court and thus reached a construction that cannot be reconciled with the science. And it must be presumed that any neutral person of skill in the art, reading the claims and specification, *would have been informed by that science* in reading the patent and thus would have reached the same claim construction as the district court.

In fact, the extrinsic evidence amplified and explained, and did not contradict, the intrinsic evidence. In ruling as it did, the Federal Circuit ignored the factual findings of the district court — scientific facts not in dispute — and in conducting a *de novo* review on a cold record, and without the benefit of the technical advisor such as the district court had, reached an erroneous and scientifically invalid claim construction.

The facts are as follows:

(a) Passive infrared sensors (PIRs) Q1 and Q2 provide brief electrical signals in response to changes

in infrared radiation, *i.e.*, changes in temperature, falling on the PIR sensors. When a PIR detects a change in infrared radiation, it emits a brief positive-going then negative-going signal, following which it returns to its steady-state. Circuit elements Q1 and Q2 are "conventional passive infrared (PIR) sensors . . . which are each responsive to infrared light produced by sources external to the lamp." (App. SA7 ('066 patent, col. 3, ll. 24-28).) This was explained to the district court, *inter alia*, by Dr. Massengill. (App. 64a.)

(b) Changes in infrared radiation incident on the PIR sensors can be caused by either (a) temperature changes in stationary objects positioned in front of the PIR sensors, or (b) motion of persons or other objects moving past the PIR sensors. When the infrared radiation falling on a sensor is given off by a stationary object, the level of infrared radiation experienced by the sensor will change if the temperature of the stationary object changes. Similarly, if the ambient level of infrared radiation falling on a sensor is lower or higher than the level of infrared radiation given off by a person or other object moving within the sensor's field, the sensor will experience a change of infrared radiation. In other words, it is not the motion per se which causes the PIR to emit a signal. Instead, it is simply the sudden presence of an object which has a different temperature than the ambient temperature experienced by the PIR which causes the PIR to emit a signal. Motion of a person or other object is simply one of the means by which a change of infrared radiation is experienced by the PIR. Since not all temperature changes causing a PIR to emit its characteristic electrical signal result from motion of

> a person or other object, a PIR does not detect motion per se and, therefore, a PIR cannot properly be said, by itself, to "detect motion of a person or other object." Stated otherwise, a PIR is no more a motion detector than is a common household thermometer. Like a PIR, a thermometer senses all changes in temperature without regard to the cause of temperature change. A thermometer positioned in direct sunlight will experience a temperature change if a person or other object (such as a cloud) moves in front of the thermometer to block the sunlight. This does not mean that the thermometer has detected motion, but only that it has detected a change of temperature. This was explained to the district court, *inter alia*, by Dr. Massengill in regard to a demonstration that was conducted before the district court. (App. 61a-63a, 64a.)
>
> (c) Pulse counting circuitry determines whether the electrical signal generated by the PIR sensors was caused by (a) temperature changes in static objects, or (b) motions of persons or objects. As Dr. Massengill also explained to the district court, determination of the "predetermined condition" — *motion* of a person or object — requires more than simply a PIR. It requires selection circuitry that can distinguish motion from changes in the ambient temperature of static objects. (App. 45a-48a.)

In reaching its determinations, the district court did exactly what the law requires — it looked at the patent through the eyes of one of skill in the art. Yet the Federal Circuit concluded that the district court "erred in relying on Professor Massengill's expert testimony." (App. 10a.) As set forth below, the complete lack of deference given to the efforts of a district court to do what the law requires — to understand the technology and

interpret the patent in the context of the technical facts — is bad policy and bad practice. The Federal Circuit's *de novo* review of claim construction is not required by any decision of this Court and is contrary to the analysis of this Court in *Markman II*. The current practice should be replaced with a practice of *de novo* review only of conclusions of law, while giving due deference to the underlying factual findings of a district court in a *Markman* proceeding.

REASONS FOR GRANTING THE PETITION

I. The Practice Of *De Novo* Review Of Claim Construction Is Ripe For Reconsideration

A. Members Of The Federal Circuit Have Cogently Discussed The Problems With *De Novo* Review After Some Eight Years Of Experience

It once might have been hoped that the problems inherent with *de novo* review of claim construction might be resolved by time and perhaps the adoption of some offsetting practices or procedures. But this has not happened. After over eight years of experience, it has become plain that the practice of *de novo* review under *Cybor* has acted to the great detriment, rather than to the benefit, of patent law. A number of judges on the Federal Circuit have persuasively argued that *Cybor* was wrongly decided, and that deference should be accorded to the factual findings of a district court in reaching a *Markman* determination. And not surprisingly, it is difficult to find any countervailing reasoned defense of *Cybor*.

In his recent dissent in *Amgen Inc. v. Hoechst Marion Roussel Inc.*, 469 F.3d 1039, 1040, 80 U.S.P.Q.2d (BNA) 1944,

1946 (Fed. Cir. 2006)[1], Judge Michel with Judge Rader joining observed:

> Rehearing this case *en banc* would have enabled us to reconsider *Cybor's* rule of *de novo* review for claim construction in light of our eight years of experience with its application. I have come to believe that reconsideration is appropriate and revision may be advisable.
>
> In my view, four practical problems have emerged under the *Markman-Cybor* regime: (1) a steadily high reversal rate; (2) a lack of predictability about appellate outcomes, which may confound trial judges and discourage settlements; (3) loss of the comparative advantage often enjoyed by the district judges who heard or read all of the evidence and may have spent more time on the claim constructions than we ever could on appeal; and (4) inundation of our court with the minutia of construing numerous disputed claim terms (in multiple claims and patents) in nearly every patent case.
>
> Our standard of review of no deference to the trial judge's claim constructions, expressed in *Cybor*, rests upon the premise that claim construction is always a purely legal exercise, devoid of factual content. We have likened claim construction to

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[1] Amgen, Inc. petitioned for a writ of *certiorari* on the same issue presented here, as well as on prosecution history estoppel, in a petition filed in March 2007. Respectfully, the instant petition is a proper companion case should the Court take up Amgen's petition. The two cases present differing but complementary examples of the problems inherent in a standard of *de novo* review of claim construction. Indeed, an advantage of the instant case is that the departure from science in the Federal Circuit's claim construction is particularly clear.

> statutory construction. I believe that this analogy is open to serious question. In interpreting statutes, a judge, whether trial or appellate, essentially asks himself/herself, "What does the disputed term mean to me, the judge, as an artisan in the law?" With claim construction, on the other hand, the judge is supposed to inquire, essentially, "How would the average artisan in the relevant field of technology understand the disputed claim terms in the context of the rest of the patent, the prosecution history, and the prior art?"
>
> It seems to me that the claim construction question often cannot be answered without assessing, at least implicitly, what the average artisan knew and how she thought about the particular technology when the patent claims were written. To make such determinations, the trial judge necessarily relies upon prior art documents and other evidence concerning the skill of the ordinary artisan at the relevant time. Indeed, trial judges are arguably better equipped than appellate judges to make these factual determinations, especially in close cases. In such instances, perhaps we should routinely give at least some deference to the trial court, given its greater knowledge of the facts.

Judge Mayer, with Judge Newman joining, issued a lengthy but very relevant and cogent critique of the *Cybor* standard of *de novo* review in his dissent in *Phillips*, 415 F.3d at 1330-1333 (footnotes and parallel citations omitted):

> Now more than ever I am convinced of the futility, indeed the absurdity, of this court's persistence in adhering to the falsehood that claim construction is a matter of law devoid of any factual

component. Because any attempt to fashion a coherent standard under this regime is pointless, as illustrated by our many failed attempts to do so, I dissent.

This court was created for the purpose of bringing consistency to the patent field. *See* H.R. Rep. No. 312, 97th Cong., 1st Sess. 20-23 (1981). Instead, we have taken this noble mandate, to reinvigorate the patent and introduce predictability to the field, and focused inappropriate power in this court. In our quest to elevate our importance, we have, however, disregarded our role as an appellate court; the resulting mayhem has seriously undermined the legitimacy of the process, if not the integrity of the institution.

. . . .

. . . [T]here can be no workable standards by which this court will interpret claims so long as we are blind to the factual component of the task. *See Cooter & Gell v. Hartmarx Corp.*, 496 U.S. 384, 405 (1990) ("Fact-bound resolutions cannot be made uniform through appellate review, *de novo* or otherwise." (quoting *Mars Steel Corp. v. Cont'l Bank N.A.*, 880 F.2d 928, 936 (7th Cir. 1989))).

Federal Rule of Civil Procedure 52(a) states that "findings of fact . . . shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of witnesses." According to the Supreme Court, this "rule means what it says" — that findings of fact, even "those described as 'ultimate facts' because they may determine the outcome of

litigation," are to be reviewed deferentially on appeal. *Bose Corp. v. Consumers Union of United States*, 466 U.S. 485, 498 & 501 (1984); *see also Anderson v. Bessemer City*, 470 U.S. 564, 575 (1985) ("Review of factual findings under the clearly erroneous standard — with its deference to the trier of fact — is the rule, not the exception."); *Pullman-Standard, Div. of Pullman, Inc. v. Swint*, 456 U.S. 273, 287 [76 U.S.P.Q. (BNA) 430] (1982) ("Rule 52(a) broadly requires that findings of fact not be set aside unless clearly erroneous."); *United States v. United States Gypsum Co.*, 333 U.S. 364, 394 (1948). Even those findings of fact based entirely on documentary evidence are entitled to deference. *Anderson*, 470 U.S. at 574 ("That [Rule 52(a)] goes on to emphasize the special deference to be paid credibility determinations does not alter its clear command: Rule 52(a) 'does not make exceptions or purport to exclude certain categories of factual findings from the obligation of a court of appeals to accept a district court's findings unless clearly erroneous.'" (quoting *Pullman-Standard*, 456 U.S. at 287)). In short, we are obligated by Rule 52(a) to review the factual findings of the district court that underlie the determination of claim construction for clear error.

While this court may persist in the delusion that claim construction is a purely legal determination, unaffected by underlying facts, it is plainly not the case. Claim construction is, or should be, made in context: a claim should be interpreted both from the perspective of one of ordinary skill in the art and in view of the state of the art at the time of invention. *See Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1477 [45 U.S.P.Q.2d (BNA) 1429] (Fed.

Cir. 1998) ("It is the person of ordinary skill in the field of the invention through whose eyes the claims are construed."). These questions, which are critical to the correct interpretation of a claim, are inherently factual. They are hotly contested by the parties, not by resort to case law as one would expect for legal issues, but based on testimony and documentary evidence. During so called *Markman* "hearings," which are often longer than jury trials, parties battle over experts offering conflicting evidence regarding who qualifies as one of ordinary skill in the art; the meaning of patent terms to that person; the state of the art at the time of the invention; contradictory dictionary definitions and which would be consulted by the skilled artisan; the scope of specialized terms; the problem a patent was solving; what is related or pertinent art; whether a construction was disallowed during prosecution; how one of skill in the art would understand statements during prosecution; and on and on. In order to reconcile the parties' inconsistent submissions and arrive at a sound interpretation, the district court is required to sift through and weigh volumes of evidence. While this court treats the district court as an intake clerk, whose only role is to collect, shuffle and collate evidence, the reality, as revealed by conventional practice, is far different.

Even if the procedures employed by the district court did not show that it is engaging in factfinding, the nature of the questions underlying claim construction illustrate that they are factual and should be reviewed in accordance with Rule 52(a). For each patent, for example, who qualifies as one of ordinary skill in the art will differ, just as the state of the art at the time of invention will differ. These subsidiary determinations are specific, multifarious and not

susceptible to generalization; as such their resolution in one case will bear very little, if at all, on the resolution of subsequent cases. *See Ornelas*, 517 U.S. at 703 ("Law clarification requires generalization, and some issues lend themselves to generalization much more than others."); *Pierce v. Underwood*, 487 U.S. 552, 561-62 (1988) ("Many questions that arise in litigation are not amenable to regulation by rule because they involve multifarious, fleeting, special, narrow facts that utterly resist generalization." (quoting Maurice Rosenberg, Judicial Discretion of the Trial Court, Viewed from Above, 22 Syracuse L. Rev. 635, 662 (1971))); *Icicle Seafoods, Inc. v. Worthington*, 475 U.S. 709, 714 (1986) (rejecting de novo review of factual questions, even when outcome determinative). That the determination of the meaning of a particular term in one patent will not necessarily bear on the interpretation of the same term in a subsequent patent illustrates this point; while the term is the same, the underlying factual context is different. It further proves that these questions (*e.g.*, who qualifies as one of ordinary skill in the art and what was the state of the art at the time of invention, among others) are implicitly being determined in each case; because we refuse to acknowledge either their existence or importance, however, the manner of their resolution is never elucidated. Finally, that claim construction is dependent on underlying factual determinations has been verified by our experience, which shows that reviewing these questions *de novo* has not clarified the law, but has instead "distorted the appellate process," causing confusion among the district courts and bar. *See Cooter*, 496 U.S. at 404 (quoting Pierce, 487 U.S. at 561); *see also Koon v. United States*, 518 U.S. 81, 99 (1996).

B. Scholars Have Uniformly Criticized The *Cybor* Rule Of *De Novo* Review For Claim Construction

Numerous scholars have examined the logical conundrums and procedural failings occasioned by a regimen of *de novo* review of claim construction. *See, e.g.*, M. Reed Staheli, *Deserved Deference: Reconsidering the De Novo Standard of Review for Claim Construction*, 3 Marq. Intell. Prop. L. Rev. 181 (1999); Matthew R. Hulse, *Cybor Corp. v. FAS Technologies, Inc.*, 14 Berkeley Tech. L.J. 87 (1999); Craig Allen Nard, *Intellectual Property Challenges in the Next Century: Process Considerations in the Age of Markman and Mantras*, 2001 U. Ill. L. Rev. 355 (2001); William H. Burgess, *Simplicity at the Cost of Clarity: Appellate Review of Claim Construction and the Failed Promise of Cybor*, 153 U. Pa. L. Rev. 763 (2005); Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 Lewis & Clark L. Rev. 231 (2005); and David Krinsky, *The Supreme Court, Stare Decisis, and the Role of Appellate Deference in Patent Claim Construction Appeals*, 66 Md. L. Rev. 194 (2006).

These scholars are essentially uniform in their critique of the fiction that claim construction does not require factual findings. They are essentially uniform in their belief that the current regimen is in dire need of correction. However, exactly how the problem should be addressed and corrected is a matter of some dispute among these scholars, which shows why this Court's intervention is necessary. The most common view is that deference to the factual findings of the district court is both appropriate and necessary, and as shown above, this view — in stronger or weaker form — appears to be shared by many members of the Court of Appeals for the Federal Circuit.

II. The *Cybor* Rule Of *De Novo* Review Of Claim Construction Has Created A Variety Of Adverse Consequences

A. District Courts Are Better Positioned To Evaluate Factual Issues

As noted by Judge Rader in his dissent in *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1380-1381 (Fed. Cir. 2005):

> This court received the typical briefs from the parties, an appendix containing selected portions of the record, and heard a total of approximately thirty minutes of argument by the parties on the issues before this court. Despite the district court's superior tools and time to evaluate the complete record, to hear and inquire from expert and fact witnesses, to delve into countless related details, to probe the scientific and semantic context, and to entertain argument as long as necessary for clarity, this court with its reading three briefs before its half-hour hearing becomes enamored with its own analysis of a very close issue and reverses the district court.

The instant case is a perfect example of a situation where the district court's factual findings deserved deference. Here, the district court had a technical advisor. The district court conducted a three-day *Markman* hearing, heard from a number of experts, and viewed live demonstrations of the technology. Because of the interactive nature of the proceedings, the district court was able to ask questions and clarify important issues as to how one of skill in the art would interpret the claims in light of the science. In contrast, the Federal Circuit had to work from a cold record and without the benefit of a technical consultant. The Federal Circuit could not judge the demeanor or credibility

of the experts, something that this Court acknowledged in *Markman II* might be critical in a close case. Such fact finding is the proper province of the district court, and is entitled to due deference.

B. It Is Purest Sophistry To Characterize Factual Findings As Something Other Than What They Are, And Such Sophistry Brings Disrepute On The Legal System

It would be pointless to elaborate on the cogent statements of members of the Federal Circuit quoted above which acknowledge that claim construction involves factual determinations. Such matters as the level of skill in the art and the meaning of the patent claims to one of skill in the art are inherently factual questions, and are treated as factual questions where they are the subject of evidentiary hearings. The sophistry of a pretense that they are not factual questions has been noted on more than one occasion. For example, in his dissent in *Cybor*, 138 F.3d at 1474, Judge Rader stated: "Under the guise of setting standards for claim construction, this court instructs experienced trial judges that they may use experts to understand, but not to interpret, the claim terms. As a matter of logic, this instruction is difficult to grasp."

And even more bluntly, in the wake of *Markman I*, the district court in *Lucas Aerospace, Ltd. v. Unison Indus., L.P.*, 890 F. Supp. 329, 333-34 n.7, 36 U.S.P.Q.2d (BNA) 1235, 1239 n.7 (D. Del. 1995) stated as follows:

> When two experts testify differently as to the meaning of a technical term, and the court embraces the view of one, the other, or neither while construing a patent claim as a matter of law, the court has engaged in weighing evidence and making credibility determinations . . . . But when the Federal

> Circuit Court of Appeals states that the trial court does not do something that the trial court does and must do to perform the judicial function, that court knowingly enters a land of sophistry and fiction.

Respectfully, when all involved know that there are factual findings that underlie the construction of patent claims, the perpetuation of a sham that there are not does nothing but bring disrepute upon our legal system. It is time for this Court to put an end to this sham.

C. The High Reversal Rate Resulting From *De Novo* Review Negatively Impacts The Administration Of Justice

There is general agreement that the rate of reversal by the Court of Appeals for the Federal Circuit on the basis of claim construction is very high. In 1998 Judge Rader suggested that the rate was approximately 40 percent. *See Cybor*, 138 F.3d at 1476 (Rader dissenting). More recently, it was suggested that the rate from 1996 through 2003 was 34.5 percent. Kimberly A. Moore, *Markman Eight Years Later: Is Claim Construction More Predictable?*, 9 Lewis & Clark L. Rev. 231, 233 (2005).

Although there is no empirical data, logic strongly suggests that this reversal rate would be significantly reduced if *de novo* review were replaced by a standard giving due deference to a district court's factual findings. As it stands, the shockingly high reversal rate necessarily has a variety of negative impacts on the administration of patent cases, many of which were anticipated by Judge Rader in his dissent in *Cybor*.

1. Wasted Judicial Resources

The high rate of reversal on the basis of claim construction means that the trial process is wasteful for both the district courts

and the litigants. As things stand, the courts and the parties may — after conducting a *Markman* proceeding — devote considerable time and resources to trial, only to find in 35 to 40 percent of cases that they may need to repeat the process after appeal. Indeed, it is not simply the trial that may need to be repeated. Where discovery and expert reports were prepared against the backdrop of the district court's claim construction ruling, they may need to be redone before a new trial can even be had, in effect starting the case over almost from scratch.

And the appeal itself becomes almost automatic; indeed, it might be viewed as malpractice not to appeal where the determinative claim construction is overturned so often on appeal. The current regime of *de novo* review thus wastes the resources of the district court and places an almost automatic burden on the Court of Appeals for the Federal Circuit in that the decisions of the district court in a patent case will seldom go unchallenged by appeal.

Indeed, the real incentive both for the litigants and the district court may be to simply move the case along as rapidly as possible to appellate review. Perversely, from the district court's perspective, the present system may create an incentive to enter a claim construction that will result in a stipulation or summary determination that a patent is not infringed or is invalid. Such a construction would facilitate an earlier appellate review and avoid the risk that a district court would have to conduct a second trial if — as happens some 40 percent of the time — the Federal Circuit overturns the claim construction. Even though most district court judges presumably would not consciously act on this incentive, it must be assumed that the high reversal rate may discourage some busy district court judges from devoting the same energies they otherwise might to resolving patent cases.

2. Disincentive To Settlement

One of the greatest potential advantages of the *Markman* proceeding was that parties usually would have the results of a central and often determinative issue — the scope of the claims — prior to trial. The *Markman* determination might eliminate the need for a trial altogether where it necessarily would lead to a finding of non-infringement (as happened here) or invalidity. Or the *Markman* determination, if not eliminating altogether the need for trial, might permit the parties to more rationally predict their relative risks and likelihoods of success, and thus facilitate settlement.

However, this promise of *Markman* has been squandered by the practice of *de novo* review. Where the district court's claim construction is so likely to be overturned on appeal, that claim construction becomes little more than an expensive non-event — hardly even a first act — that loses much or all of its impact to promote settlement. As Judge Rader observed in his dissent in *Cybor,* 138 F.3d at 1476:

> [T]he current *Markman I* regime means that the trial court's early claim interpretation provides no early certainty at all, but only opens the bidding. The meaning of a claim is not certain (and the parties are not prepared to settle) until nearly the last step in the process — decision by the Court of Appeals for the Federal Circuit. To get a certain claim interpretation, parties must go past the district court's *Markman I* proceeding, past the entirety of discovery, past the entire trial on the merits, past post trial motions, past briefing and argument to the Federal Circuit — indeed past every step in the entire course of federal litigation, except Supreme Court review. In implementation, a *de novo* review of claim interpretations has postponed the point of certainty

to the end of the litigation process, at which point, of course, every outcome is certain anyway.

3. Inadequate Appellate Record

Where district court judges are forced to pretend that claim construction is purely a matter of law, there is little incentive to develop a factual record, and indeed, a strong disincentive to make any actual findings of fact. The negative consequences are twofold: (1) the creation of a poor record for appeal, and (2) gamesmanship where the parties can treat the meaning of claims as a purely legal issue unfettered by underlying facts and thus take strikingly different positions before the district court and the Court of Appeals for the Federal Circuit.

In *Lava Trading Inc. v. Sonic Trading Mgmt. LLC*, 445 F.3d 1348 (Fed. Cir. 2006), *reh'g denied, reh'g, en banc, denied,* 2006 U.S. App. LEXIS 14548 (Fed. Cir. May 31, 2006), the case went up on appeal after stipulated judgments of non-infringement. As the court stated:

> At the onset, the procedural posture of this appeal presents problems. For instance, this court notes that defendants' counterclaims of invalidity and unenforceability are still pending before the trial court. These pending counterclaims put this court in the awkward position of reviewing a claim construction that may implicate issues and claims beyond this court's current reach . . . .
>
> In addition, this record on appeal does not supply any meaningful comparison of the accused products to the asserted claims. Without knowledge of the accused products, this court cannot assess the accuracy of the infringement judgment under review and lacks a proper context for an accurate claim

> construction. "While a trial court should certainly not prejudge the ultimate infringement analysis by construing claims with an aim to include or exclude an accused product or process, knowledge of that product or process provides meaningful context for the first step of the infringement analysis, claim construction." [Citations omitted.] Without the vital contextual knowledge of the accused products or processes, this appeal takes on the attributes of something akin to an advisory opinion on the scope of the 2982 patent.

Id. at 1350.

As Judge Mayer noted in his dissent:

> The decision today is yet another example of the unfortunate consequences of *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 [34 U.S.P.Q.2d (BNA) 1321] (Fed. Cir. 1995) (*en banc*), *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448 [46 U.S.P.Q.2d (BNA) 1169] (Fed. Cir. 1998) (*en banc*), and *Phillips v. AWH Corp.*, 415 F.3d 1303 [75 U.S.P.Q.2d (BNA) 1321] (Fed. Cir. 2005) (*en banc*), which cemented this court's jurisprudence with respect to claim construction as being purely a matter of law subject to *de novo* review. Because claim construction is treated as a matter of law chimerically devoid of underlying factual determinations, there are no "facts" on the record to prevent parties from presenting claim construction one way in the trial court and in an entirely different way in this court. By not dismissing this case, we issue a decision based on an undeveloped record. We set ourselves up to have to decide claim construction again later, which could well differ from the ruling today.

> Furthermore, allowance of an appeal of the trial court's perfunctory, offhand ruling from the bench, for all intents and purposes allows an interlocutory appeal of claim construction, which portends chaos in process.

Id. at 1355.

III. The Time Has Come For This Court To Act

Despite the cogent condemnation by scholars and many of its own members of the practice of *de novo* review of claim construction, the Federal Circuit has shown itself unwilling to act to correct the mistake that it made in *Cybor*. The practice of *de novo* review of the facts underlying claim construction was never compelled under the law, and indeed is inconsistent with Federal Rule of Civil Procedure 52(a) and the traditional separation of roles between the district and appellate courts. The most that can be said for such *de novo* review is that it was a well-intended experiment. But the experiment has failed. Not only has it not brought the benefits promised under *Markman I* and *Markman II*, but it has acted to discourage settlement, lengthen litigation, waste judicial resources, demoralize the patent bar and district court judges, and bring the law into disrepute by the forced sophistry that claim construction is not based on underlying factual findings.

The present case illustrates the failure of *de novo* review. Here, the district court had a technical advisor, heard expert testimony and even received demonstrations of the technology at issue. This was proper and consistent with the charge to the district court to construe patent claims from the perspective of one of skill in the art. To treat a patent document as purely a legal document and not a technical document is simply to ignore reality, and to refer to facts as something other than facts is to promote a type of Orwellian doublespeak. As shown above, the

district court got the claim construction right because it got the science right. The Federal Circuit, reviewing a cold record and without the benefit of either a technical advisor or an interactive *Markman* process, made a determination that it could not have made under a standard of deference, and therefore reached a claim construction that was simply wrong in that it did not comport with the underlying science.

The Federal Circuit has had years to reconsider its practice of *de novo* review of claim construction, but, despite the cogent criticism of certain members of that court, has failed to act. The *Markman* process should be open and above board. A district court should be encouraged to develop a proper factual record. It should be encouraged, commensurate with the difficulty of the technology, to use technical advisors as appropriate and to have evidentiary *Markman* hearings. The evidence at such hearings should be weighed according to traditional principles. And the district court should provide the factual findings underlying its claim construction for proper appellate review. In turn, the Federal Circuit should give appropriate deference to those findings (taking into account such factors as the difficulty of the technology and the thoroughness of the fact finding process), and should not be permitted to either ignore or reject such underlying factual findings without a substantive rationale.

This Court should grant the petition for a writ to correct not only the error in the present case but to correct the greater error of a practice of pure *de novo* review of claim construction with no appropriate deference to factual findings.

CONCLUSION

The petition for a writ of certiorari should be granted.

Respectfully submitted,

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APPENDIX

APPENDIX A — OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT DECIDED JANUARY 4, 2007

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

No. 06-1168

DESA IP, LLC,

Plaintiff-Appellant,

v.

EML TECHNOLOGIES, LLC and COSTCO WHOLESALE CORPORATION,

Defendants-Appellees.

DECIDED: January 4, 2007

Before MICHEL, *Chief Judge*, PLAGER, *Senior Circuit Judge*, and RADER, *Circuit Judge*.

MICHEL, *Chief Judge*.

In this patent case, DESA IP, LLC ("DESA") appeals from a stipulated judgment of non-infringement, entered by the United States District Court for the Middle District of Tennessee following a claim construction hearing. *DESA IP, LLC v. EML Techs., LLC,* No. 3-04-0160 (Nov. 21, 2005). Because the district court erred in construing "sensor means" and other disputed terms, we *vacate* and *remand.*

Appendix A

I. BACKGROUND

DESA is the owner of United States Patent No. 5,598,066 ("the '066 patent"), directed to motion-activated security lights. The '066 patent discloses a light that illuminates at two levels: (1) a dim "accent" level when dusk is detected by a photocell within the apparatus and (2) a brighter "security" level which is rapidly activated when motion is detected by a passive infrared motion sensor. The lamp remains illuminated at the "security" level as long as the motion sensor continues to detect motion (which resets an internal timer), but eventually returns to "accent" mode. When the photocell senses daylight, however, the lamp is turned off.

The '066 patent further discloses that, in the preferred embodiment, there is a "manual override" feature, which keeps the light continuously on at the brighter "security level" until daylight. The preferred embodiment also has a "pulse counting" feature, which avoids false triggering by activating the "security" mode only when motion is twice detected by the sensor within a specified time period. These additional features, (neither of which are present in the accused device), are explicitly recited in some, but not all, of the claims.

On February 27, 2004, DESA filed suit against EML Technologies LLC ("EML") and Costco Wholesale Corporation ("Costco"),[1] alleging infringement of claims 6, 9, 10 and 11 of the '066 patent. Claim 6 recites:

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1. Costco imports and sells the allegedly infringing motion-activated security lights manufactured by EML.

Appendix A

An apparatus comprising:

first sensor means for detecting a first predetermined condition external to said apparatus, said first predetermined condition being motion relative to said first sensor means of a person or object separate from said apparatus;

second sensor means for detecting a second predetermined condition, said second predetermined condition being a predetermined level of light external to said apparatus;

a lamp which can emit a first level of illumination and which can emit a second level of illumination substantially greater than said first level of illumination, said lamp being capable of switching rapidly from said first level of illumination to said second level of illumination; and

control circuit means coupled to said lamp and responsive to said first and second sensor means for causing said lamp to emit light at said first level of illumination in the absence of said first predetermined condition in response to said second predetermined condition, and for causing said lamp to emit light at said second level of illumination in response to detection of said first predetermined condition;

wherein said control circuit means includes means responsive to detection of said first predetermined

condition for initiating measurement of a predetermined time interval, and responsive to expiration of said time interval for causing said lamp to thereafter emit light at said first level of illumination in response to said second predetermined condition in the absence of a recurrence of said first predetermined condition.

Claim 9 recites:

sensor means for detecting a predetermined condition external to said apparatus;

a lamp which can emit a first level of illumination and which can emit a second level of illumination substantially greater than said first level of illumination, said lamp being capable of switching rapidly from said first level of illumination to said second level of illumination; and

control circuit means coupled to said lamp and responsive to said sensor means for causing said lamp to emit light at said first level of illumination in the absence of said predetermined condition, and for causing said lamp to emit light at said second level of illumination in response to detection of said predetermined condition, wherein said control circuit means is powered by an AC voltage, and wherein said control circuit means include switching means for selectively permitting and preventing the application of said AC voltage to said lamp and means for causing

> said switching means to be actuated for a selected portion of each half wave cycle of said AC voltage, said portion of said half waves being greater for said second level of illumination than for said first level of illumination.

Claims 10 and 11, although likewise drafted as independent claims, merely add additional limitations to those recited by claim 9.

The district court appointed as technical advisor Dr. Charles Carnal, a professor of electrical engineering at Tennessee Technological University. It held a three-day *Markman* hearing, during which multiple experts for both sides testified as to (1) the applicability of 35 U.S.C. § 112, ¶ 6 and (2) the meaning of the disputed claim terms.[2] At the end of the hearing, the court orally rendered its claim construction ruling. Hr'g Tr. 656-78, Oct. 27, 2005.

Most relevant to this appeal, the district court construed the disputed terms "sensor means," "control circuit means," and "switching means." As a preliminary matter, the court concluded that 35 U.S.C. § 112, ¶ 6 applied to all three of these phrases because the asserted claims did not recite sufficient structure, materials, or acts to perform the recited functions. *Id.* at 659:8-11.

The court found the corresponding structure for "first sensor means for detecting a first predetermined condition

2. Mark Patterson, William Raper, Thomas J. Paulus, and Steven Carlson testified for DESA. J. Michael Thesz, Scott Evans, and Professor Lloyd Massengill testified on behalf of EML and Costco.

external to said apparatus" in claim 6-where "first predetermined condition" was internally defined within claim 6 to be "motion relative to said first sensor means of a person or object separate from said apparatus"-described at col.3 l.24-col.4 l.5 of the specification. *Id.* at 664:6-14. This definition includes not only the passive infrared sensors Q1 and Q2, but also what Professor Massengill dubbed "selection circuitry," i.e., circuits 43, 46, 47, 48 and 51 of Figures 2A and 2B. *See id.* at 481:5-11. The same meaning was ascribed to "sensor means for detecting a predetermined condition external to said apparatus" in claims 9, 10 and 11. *Id.* at 665:16-25.

As for "control circuit means," the court found that this described, in plain language, "the means for causing the lamp to go on at accent level when there is no motion but it's dark or dusk, and then going up to the higher level of illumination, which I believe is 95%, in response to detection of the motion of a person or object." *Id.* at 667:15-22. It found the corresponding structure for this function described at col.5 l.63-col.6 l.14. *Id.* at 667:24-668:4.

Finally, "switching means for selectively permitting and preventing the application of said AC voltage to said lamp" was described by the court in plain language as "basically a switch that allows the lamp to either be on or off." *Id.* at 670:5-6. The court found the corresponding structure described at col.5 ll.13-25, which was, as EML and Costco had argued, "more than just the triac."[3] *Id.* at 670:22.

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3. A triac is a type of electronic switch.

The court then stressed that all of the means-plus-function terms were being construed to include structural equivalents, too. *Id.* at 672:17. On October 31, 2005, the court issued a written order adopting these oral rulings without further explanation.

DESA subsequently conceded that none of the asserted claims were infringed, and a stipulated judgment was entered on November 21, 2005. This judgment is expressly conditioned upon the district court's interpretation of "sensor means" being upheld on appeal. A timely notice of appeal was filed on December 16, 2005. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. DISCUSSION

Claim construction is a question of law reviewed de novo. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454-56 (Fed.Cir.1998) (en banc). When construing claim terms, the court determines the customary meaning of claim terms as understood by a person of ordinary skill in the art according to the methodology set forth in *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582-83 (Fed.Cir.1996) and reaffirmed in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-19 (Fed.Cir.2005) (en banc).

A

Where an element in a claim is expressed as a means or step for performing a specified function without reciting structure, it "shall be construed to cover the corresponding structure, material, or acts described in the specification and

equivalents thereof." 35 U.S.C. § 112, ¶ 6. This two-step inquiry involves determining (1) whether § 112, ¶ 6 applies and, if it does, (2) identifying the claimed function and corresponding structures in the written description. *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1360 (Fed. Cir. 2000).

The use of the word "means" in the claim language invokes a rebuttable presumption that § 112, ¶ 6 applies; conversely, the failure to use "means" invokes a presumption that § 112, ¶ 6 does not apply. *Apex Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364 (Fed. Cir. 2003). Here, the key disputed phrases are "sensor means," "control circuit means," and "switching means." Nonetheless, the presumption that § 112, ¶ 6 applies may be rebutted if the claim recites no function or recites sufficient structure for performing that function. *Sage Prods., Inc. v. Devon Indus., Inc.*, 126 F.3d 1420, 1427-28 (Fed. Cir. 1997).

The trial court recognized that the use of the word "means" invoked the presumption that § 112, ¶ 6 applied, but resorted to expert testimony to resolve whether that presumption was rebutted. DESA presented evidence from Mr. Patterson that the use of "means" language was ambiguous because it was commonly used in electronics patents without necessarily intending to invoke § 112, ¶ 6. Mr. Carlson and Mr. Raper further testified that the modifiers "sensor," "control circuit," and "switch" were commonly understood by those skilled in the art to describe structure. Defendants' experts testified to the contrary. The district court ultimately rejected DESA's argument that the asserted claims

contained sufficient structural language to escape the application of § 112, ¶ 6. Hr'g Tr. at 659:12-15.

Although the district court seemed to rely upon expert testimony,[4] we note that its conclusion could have been reached without the aid of extrinsic evidence. First, the claims use both means-plus-function language (i.e., "sensor means," "control circuit means," etc.) and structural language (i.e., lamp, zero crossing detect circuit, etc.), which suggests that the patentee intentionally used "means" language to invoke § 112, ¶ 6. Second, the claims recite a function for each of these "means" limitations without specifying what structure(s) would be required to perform that function. Third, we reject DESA's argument that the use of "sensor," "control circuit," and "switching" before the word "means" was sufficient to denote structure. Rather, those modifiers were simply used to distinguish between subsequent references to different "means" limitations within the same claim, i.e., "said first and second sensor means" as opposed to "said control circuit means." Finally, DESA argues that this court has previously stated that "it is clear that the term 'circuit' by itself connotes some structure." *Apex,* 325 F.3d at 1373. In *Apex,* however, the word "means" was not used, so the reverse presumption-i.e., that § 112, ¶ 6 does not apply-was invoked. Here, we agree with the district court that DESA failed to overcome the presumption that § 112, ¶ 6 *does* apply to "sensor means," "control circuit means," and "switching means."

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4. While the court did not explain in detail the reasons behind its oral decision, we infer that the court found the expert testimony of Mr. Thesz and Professor Massengill to be more persuasive.

Appendix A

B

We now consider whether the district court correctly identified the claimed functions and corresponding structures of the disputed phrases. We conclude that it erred in relying upon Professor Massengill's expert testimony. In doing so, the district court construed each disputed claim term by simply referring to various passages in the specification that corresponded to portions of Figures 2A and 2B, which depict the preferred embodiment. Expert testimony in conflict with the intrinsic evidence, however, should have been accorded no weight. *Phillips,* 415 F.3d at 1318; *see also Markman v. Westview Instruments,* 517 U.S. 370, 390, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996) (holding that expert testimony must be evaluated in a manner that "fully comports with specification and the claims" and "preserve[s] the patent's internal coherence").

1

With respect to "first sensor means" (of claim 6) or "sensor means" (of claims 9, 10, and 11) for detecting motion, the central dispute is whether this includes "selection circuitry" such as the pulse-counting function, as Professor Massengill testified. On appeal, DESA reiterates its argument that only Q1 and Q2-i.e., the passive infrared sensors depicted in Figure 2A-perform the motion-detecting function. We agree that "sensor means" is properly construed as "Q1 and Q2 or equivalents." All the other parts of Figures 2A and 2B, including the pulse-count function at 51, are part of the control circuit in the preferred embodiment.

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Not only does the specification of the '066 patent repeatedly refer to the passive infrared sensors Q1 and Q2 as the "sensors," it even explicitly states that "[t]he sensors Q1 and Q2 are each coupled to a detector portion 43 of the *circuit,*" (emphasis added) and then goes on to describe the additional functions of the circuit—i.e., selecting and amplifying the "signals most likely to correspond to infrared signals from a human body." Col. 3 ll.34-35, 38-39. Because the intrinsic evidence clearly sets forth the corresponding structure for "sensor means," it was improper to rely upon contrary extrinsic evidence to construe this term.[5]

2

Although the stipulated judgment was only conditioned upon the claim construction of "sensor means," we now address the proper construction of "control circuit means." EML and Costco argue that the patentee distinguished certain prior art on the basis that the invention had a pulse-counting feature as "generally disclosed." Thus, they argue, the pulse-counting feature is a limitation of every claim, and if "sensor means" does not limit the invention to those devices with a pulse-counting function, then "control circuit means" does. We disagree.

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5. In any event, we reject with Professor Massengill's testimony that the "selection circuitry" is part of the "sensor means." Rather, the passive infrared sensors Q1 and Q2 detect motion, while the pulse-counting feature and other parts of the circuit are used to decide whether the lamp switches to the brighter level of illumination in response or whether the detected motion is ignored.

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The structure corresponding to "control circuit means" (i.e., everything except the lamp, the passive infrared sensors, and the photocell) necessarily varies from claim to claim, depending on the functions disclosed. For example, claim 6 contains a limitation wherein the lamp will revert to the first level of illumination after a predetermined time interval if additional motion is not detected, *see* col. 8 ll.12-19, so a control circuit would have to include portion 52 of Figure 2B or its equivalent to be within the scope of claim 6. Claims 9-11, however, lack this particular limitation and would not require portion 52 to be part of an infringing control circuit. The same holds true for the pulse-counting function, which is expressly recited as a limitation only in claim 12.

Moreover, the Jensen/McCavit declaration in the prosecution history states that the prior art also lacked "other features as recited in the claims," not just the pulse-counting function. Specifically, the Nippon reference was distinguished on several grounds. Some claims recite the manual-override function, others recite the pulse-counting function, and "[i]n addition, [application] claims 2, 10, 11 and 12[6] are directed to features clearly not disclosed or suggested in the instruction manual." Although the validity of these claims remains to be decided, nothing in the prosecution history suggests that either the manual-override function or the pulse-counting function was intended to be a limitation of every claim. Unlike application claim 16 (which ultimately issued as claim 12), the claims asserted by DESA were not distinguished over prior art on the basis of the pulse-counting function.

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6. These claims were renumbered and issued as claims 6, 9, 10, and 11.

Finally, as to "switching means" in claims 9, 10 and 11, we agree with DESA that this claim term is properly construed to mean "triac Q3 or equivalents." The other structures described in the portion of the specification referenced by the district court correspond to the "means for causing said switching means to be actuated for a selected portion of each half wave cycle of said AC voltage." Again, the court erred in relying upon expert testimony that was inconsistent with the intrinsic evidence.

III. CONCLUSION

For the aforementioned reasons, we vacate the stipulated judgment of non-infringement and remand for further proceedings consistent with this opinion. We expressly encourage the district court to revisit its claim construction for any other terms it deems necessary.

APPENDIX B — STIPULATION OF JUDGMENT WITH ATTACHMENTS OF THE UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF TENNESSEE, NASHVILLE DIVISION FILED NOVEMBER 21, 2005

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

CIVIL Action No. 3-04-0160
Judge Aleta A. Trauger
Magistrate Judge Joe B. Brown

DESA IP, LLC,

Plaintiff,

v.

EML TECHNOLOGIES LLC and COSTCO WHOLESALE CORPORATION,

Defendants.

STIPULATION OF JUDGMENT PURSUANT TO FRCP 54(b)

Plaintiff, DESA IP, LLC ("DESA") and defendants, EML Technologies LLC and Costco Wholesale Corp. (collectively, "Defendants"), each by counsel, jointly stipulate and move for entry of final judgment pursuant to Federal Rule of Civil Procedure 54 (b), on the terms and conditions set forth herein.

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Good cause appearing, judgment shall be entered as follows:

1. DESA accuses defendants of infringing Claims 6, 9, 10 and 11 of United States Patent Number 5,598,066 ("the '066 patent"). Defendants deny infringement and seek *inter alia* to have the patent held invalid as anticipated and/or obvious in view of certain prior art, and unenforceable as result of alleged failure to satisfy the duty of candor during prosecution of the '066 patent.

2. Following extensive briefing, this Court held a three day Markman hearing on October 25-27, 2005, during which time the Court reviewed *inter alia* the patent claims, patent specification and selected portions of the '066 patent, and received tutorial testimony and demonstrations from experts and other witnesses on behalf of each party.

3. With the consent of the parties, and at the shared expense of the parties, in order to aid the court in understanding the technical information presented by the parties during the course of the briefing and at the Markman hearing, the Court was assisted by Professor Charles L. Carnal.

4. At the conclusion of the hearing, the Court rendered its Markman ruling orally, on the record, construing each of the contested claim elements ("Markman Ruling"). A transcript of the Court's oral Markman Ruling is attached hereto as Appendix I. In the Markman Ruling, the Court referred to individual claim elements by reference letters used by Professor Massengill in his "Master Claim Chart,"

[hearing Exhibit 48] a copy of which is attached hereto as Appendix II; and to diagrams used by Professor Massengill to illustrate which portions of the schematic diagram in Figures 2A and 2B of the '066 patent he contended represents the structure corresponding to the various claim elements [hearing Exhibit 49], a copy of which is attached hereto as Appendix III.

5. Each of the asserted claims 6, 9, 10 and 11 contain the following claim element: "sensor means for detecting a [first] predetermined condition external to said apparatus" ("sensor means claim element").

6. In the Markman Ruling, this Court concluded *inter alia* that the sensor means claim element is governed by 35 U.S.C. §112 ¶ 6; and, pursuant to §112 ¶ 6, this Court identified and construed the sensor means claim element to cover certain structure from the specification identified in the Markman Ruling, and equivalents thereof.

7. In view of the Markman Ruling, and particularly those portions of the Markman ruling set forth in the foregoing paragraph of this Stipulated Judgment, and because the accused device does not include structure which is the same as or equivalent to the structure which this Court has identified as corresponding to the sensor means claim element, DESA has concluded that it cannot prove infringement of claims 6, 9, 10 and 11 so construed, either literally or by doctrine of equivalents, and stipulates to entry of judgment as to non-infringement of the so-construed claims 6, 9, 10 and 11 the '066 patent.

8. DESA does not waive, and specifically reserves, the right to appeal any and all aspects of this Court's Markman Ruling.

9. Unless this Court's Markman rulings identified in paragraph 6 herein are reversed or vacated on appeal, the stipulated judgment of non-infringement finally resolves DESA's claims against Defendants. Accordingly, to avoid the time and expense needed to resolve Defendants' claims against DESA, the parties have agreed to a dismissal without prejudice as to Defendants' claims and affirmative defenses against DESA.

10. Accordingly, pursuant to Federal Rule of Civil Procedure 54 (b), this Court determines that there is no just reason for delay and expressly directs entry of judgment of non-infringement in accordance here with.

11. This Court shall retain and hereby does retain jurisdiction over this matter in its entirety, including any claims which may be reinstated.

The undersigned hereby stipulate to entry of this judgment:

By: s/ Robb S. Harvey
Robb S. Harvey

James R. Higgins, Jr.
Robert J. Theuerkauf

COUNSEL FOR PLAINTIFF, DESA IP, LLC

By: s/ Steven A. Riley
Steven A. Riley

Roger L. Cook

COUNSEL FOR DEFENDANTS EML TECHNOLOGIES LLC -and- COSTCO WHOLESALE CORPORATION

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ORDER

IT IS SO ORDERED this 21st day of November, 2005

s/ Aleta Trauger
Hon. Aleta Trauger
United States District Court Judge

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APPENDIX I

UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF TENNESSEE NASHVILLE DIVISION

CASE NO. 3:04-0160

DESA IP, LLC,

Plaintiff,

vs.

EML TECHNOLOGIES, LLC and COSTCO WHOLESALE CORPORATION,

Defendants.

EXCERPT OF PROCEEDINGS
VOLUME A

JUDGE'S RULING

BEFORE: THE HONORABLE ALETA A. TRAUGER

DATE: OCTOBER 27, 2005

TIME: 9:00 A.M.

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THE COURT: All right. The Court is going to orally give its decision on the claim construction in this case. It will never be fresher in my mind.

We have had a three-day hearing, *Markman* hearing. I have had — prior to the hearing and during the hearing, I have had the assistance of my court-appointed expert, Dr. Charles Carnal, who is a professor at Tennessee Technological University in electrical engineering.

And he has been of immense assistance to the Court, and I thank the parties for making him available to me and paying for him.

It was very helpful to me, as was the *Markman* hearing in terms of all the expert testimony that I have heard and the arguments for needed background and assistance in construing these claims.

DESA, the plaintiff here, has sued EML and Costco for infringement of four independent claims of their patent titled "A two level security lighting system bearing patent number 5,598,066," which I'll refer to as the '066 patent, as have the parties at this hearing. The claims that remain in dispute are Claims 6, 9, 10 and 11.

Determining whether a patent claim has been infringed involves two steps. First, the Court must construe the meaning and scope of the disputed claims.

Second, the fact-finder — and here, I believe we have a jury trial. Have you all requested a jury?

MR. COOK: Yes.

THE COURT: Okay. The fact-finder, in this case a jury, will determine whether the claims as properly construed read on the accused device or whether there is an infringement.

The purpose of this hearing, which again has been three full days, held in accordance with *Markman,* was to accomplish the first of these two steps, the construction of the claims, which is a matter of law for the Court.

The major dispute here is whether — the first major dispute is whether the relevant terms in each claim — and each claim that is in dispute is a claim that uses the word "means" — whether each of those claims are written in means plus function format so as to invoke 35 United States Code Section 112/6, which provides — and I'm quoting — "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure material or acts in support thereof, and such claim shall be construed to cover the corresponding structure material or acts described in the specification and equivalence thereof."

So the first thing the Court has to decide is whether Section 112/6 applies.

It is well settled that a claim limitation that actually uses the word "means" invokes a rebuttable presumption that Section 112, paragraph 6 applies. And that's a quote from the *Apex* case, 325 F.3d 1365, 2003 decision of the federal circuit.

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That is not in dispute. I think both parties agree that the presumption applies when the word "means" is used.

And by contrast, a claim term that does not use the word "means" will trigger a rebuttable presumption that Section 112 does not apply. Thus, the use of the word "means" is central to the determination.

Here, all of the disputed claims use the word "means", so the presumption applies. The presumption may be rebutted in the following ways.

When a claim term does not use the term "means" but nonetheless relies on functional terms rather than structure or material to describe performance of the claimed function, the presumption collapses.

Conversely, when a claim does use the term "means", the presumption is rebutted where either the claim does not specify a corresponding function for the means or where the claim recites a function but then goes on to elaborate sufficient structure material or acts within the claim itself to perform entirely the recited function.

DESA contends that the claim terms containing the word "means" recite sufficient structure material or acts so as to rebut the presumption that Section 112/6 applies.

And the burden is on DESA to demonstrate that by a preponderance of the evidence.

And the Court has looked at these claims as a whole, not just the elements that are disputed. And the Court finds that there is not elaborated in the claims sufficient structure material or acts within the claim to perform entirely the recited function.

The Court does not find persuasive that the language that the plaintiff thinks denotes structure denotes structure; and, therefore, the Court finds that the presumption has not been rebutted.

So moving on from that decision, in order to apply Section 112/6, the federal circuit has stated that Section 112/6, as is well documented, was intended to permit use of means expressions without recitation of all the possible means that might be used in a claimed apparatus.

However, the price that must be paid for use of that convenience is limitation of the claim to the means specified in the written description and equivalence thereof. And that's a quote from the *0I Corp.* case.

Accordingly, once it has been determined that the section applies, the Court must do two things: First, identify the function as the unrecited means that is explicitly recited in the claim; and then identify the corresponding structure that performs the particular function set forth in the claim.

With respect to the first step, identification of the function does not permit the limitation of a means plus function claim by adopting a function different from that explicitly recited in the claim. And that comes from

Micro Chemicals. The function must in fact come from within the claim.

However, with regard to the second step, the identification of the structure to perform the function, the Court resorts to the description and all parts of the patent — the written description and all the relevant parts of the patent.

And the Court must limit that inquiry pretty carefully so that only the structural features needed to perform the recited function at issue are cited as determining what the structure is.

To determine if the structure disclosed in the specification is corresponding structure, the specification or prosecution history should clearly link or associate that structure to the function recited in the claim.

So moving on to the actual claims that are at issue here — let me give a little bit more background on the law before I do that.

The *Phillips* case — I know the *Markman* hearing here has been a tutorial for the Court. And the Court views the *Phillips* case as a bit of a tutorial as well because it kind of walks us through some of this analysis and also makes it pretty clear what the specification is, which is what the Court makes reference to in construing these claims and finding the structure.

The *Phillips* court makes it very clear that claims are to be read in view of the specification of which they are a part,

and the specification is always highly relevant to the claimed construction analysis and often dispositive, usually dispositive.

The close kinship between the written description and the claims is enforced by the statutory requirement that the specification described the claimed invention in full, clear, concise and exact terms.

The claims are to be construed to be consistent with the specification of which they are a part.

The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be in the end the correct construction.

And the Court takes instruction from the *Phillips* case on the importance of the specification.

The plaintiffs in this — plaintiff in this case has tried vigorously to limit the specification here, which appears at the beginning of the patent, to, oh, maybe the abstract, and maybe the summary of the invention, and maybe the field of the invention, but that is not enough.

I think the case law and the testimony here make it very clear that the description, the detailed description, which begins in column 2 of this patent and goes until we get to the claims, which start in column 7, is the specification to which — in part, the specification to which the Court must refer to find the structure.

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And it did not escape my notice that plaintiff's counsel in his argument when he was referring to the patent itself was referring in one of his arguments to column 3, and column 3 is in the detailed description.

And the Court views all of this material at the beginning of the patent before we get to the claims as specifications that are appropriate to consult in construing the claims and in trying to find the structure that was intended to fulfill the function of each individual claim and does not, moreover, describe just the preferred embodiment.

The diagrams are specifically figures 2A and 2B, which have played an important part throughout this hearing. The patent in column 2 states that the preferred — a preferred embodiment of the present invention is described in detail with reference to the accompanying drawings, making reference to Figures 1, 2A and B, and 3. And the Court puts the drawings one notch below the description.

In construing these claims, my initial resort was to the text description to find out how this patent provides structure for the function.

However, in going through that process, it became pretty clear to me that Figure A — 2A and 2B very closely track the actual text.

So I'm going to put it one notch below and say that it — it's a little more of a preferred embodiment, but I really think it's part and parcel of the specification.

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And so I will be referring in my claim construction to both the text and the diagram, 2A and 2B, which provide a visual for the elements that make up the structure.

The first term to be construed is the first sensor means for detecting a first predetermined condition external to said apparatus. This is a term in Claim 6.

The defendant has — defendants' witness, Dr. Massengill, has referred to this as "I" in his materials. The parties are in agreement that the first predetermined condition is defined as what is self defined in Claim 6 as motion relative to said first sensor means of a person or object separate from said apparatus.

So there's no dispute about what first determined condition external to said apparatus means It is the self-defined term where the patent writer is acting as their own lexicographer? Lexicographer.

And the structure that the Court finds in the text to support the function of — for detecting a first predetermined condition external to said apparatus is — begins in column 3 with line 24 and goes to the end of column 3 and to the top of column 4, ending with line 5 at the top of column 4.

The Court finds that that entire section describes the structure for accomplishing the function of that first claim term.

And I am going to refer to Dr. Massengill's lettering for

this because it seems to be the most consistent. We had so many claim charts and everybody calling these things different things. I'm going to refer to that as "I".

And the parties seem to be in agreement that the next term to be construed, which Dr. Massengill calls Claim A, sensor means for detecting a predetermined condition external to said apparatus, which occurs in Claims 9, 10 and 11 — first of all, the parties agree that a predetermined condition external to apparatus is equivalent to the first predetermined condition, which is the motion of a person or object. I'm correct there, aren't I? You all agree on that?

MR. HIGGINS: (Counsel moves head up and down.)

MR. COOK: I'm sorry. I was distracted.

THE COURT: Okay. The — you agree, don't you?

MS. MITRAKOS: We do, Your Honor.

THE COURT: Mr. Higgins?

MR. HIGGINS: Yes.

THE COURT: We have got agreement. That was my impression. And that both of these claims, I and A, therefore can be construed in the same way in terms of tracking the structure.

And so the Court finds that the structure to support the function described in A for detecting a predetermined condition external to said apparatus is the same thing I just

described, column 3, line 24 through column 4, line 5.

MS. MITRAKOS: Can you repeat that, Your Honor? I'm sorry.

THE COURT: It's the same ruling as for "I". Claim A and Claim I have exactly the same ruling, and I will add to that "and equivalence".

And in terms of the drawings, the drawings illustrate the elements that are included in this part of the description and that are tracked in that description. The next element I will construe is what Dr. Massengill has dubbed Element J. And that is second sensor means for detecting a second predetermined condition.

The parties agree on what the second predetermined condition is and that it is nighttime. That is not disputed.

And so the function that we must find the structure for is for detecting, basically, nighttime. The plaintiff finds that this structure is only the photocell, and the defendant maintains that it includes the photocell and the resistors that appear on diagram J.

And the Court finds that the — construes this claim in consonance with the defense view of this needed structure; and that is the photocell plus the resistors and equivalence.

And I want to find the textual reference for that. That is column 4, lines 19 and 20.

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The next claim is what Dr. Massengill refers to as K1. It appears in Claim 6. And the parties seem to agree that what Dr. Massengill labels Cl, which occurs in Claims 9, 10 and 11, is equivalent and the same, the same claim, and I'll hear from anybody who disagrees. I think that's correct. Is that correct?

MR. HIGGINS: I don't disagree, Your Honor.

THE COURT: Okay.

MS. MITRAKOS: That's correct.

MR. COOK: That's correct.

THE COURT: Okay. This claim reads: Control circuit means coupled to said lamp and responsive to said first and second sensor means for causing said lamp to emit light at said first level of illumination in the absence of said first predetermined condition in response to said second predetermined condition and for causing said light — said lamp to emit light at said second level of illumination in response to detection of said first predetermined condition.

And, basically, this just means in plain language, which at this point at least we can all understand, I certainly didn't understand it at the beginning of this proceeding, that the function is the means for causing the lamp to go on at accent level when there is no motion but it's dark or dusk, and then going up to the higher level of illumination, which I believe

is 95 percent, in response to detection of the motion of a person or object.

So that's the plain language of what we're looking for. And the Court finds that the structure that defines that function or carries out that function is found beginning at the bottom of column 5 in the middle of line 63, beginning with the words, "At night the photocell causes different threshold voltage to appear at node 61," and ending with column 6, line 14, the end of that paragraph.

So it starts four or five lines down from the beginning of the paragraph and ends at the end of that paragraph.

The Court construes that language and that text to provide the structure for that function. Again, that is Dr. Massengill's K1 and C1. And the Court finds the diagrams by Dr. Massengill illustrative of the elements included within this structure, which are the same.

The next claim to construe is what Dr Massengill calls K2. And, actually, I think I don't need to construe this claim because I believe the parties are in agreement.

This is the control circuit means includes means responsive to detection of said first predetermined condition for initiating measurement of a predetermined time interval and responsive to expiration of said time interval for causing said lamp to thereafter emit light at said first level of illumination in response to said second predetermined condition in the absence of a recurrence of said first predetermined condition.

Basically, in plain language, this means a structure that will bring about having the lamp go back to the accent setting after a set time interval after motion has been detected.

So, in other words, it's in accent mode, a motion is detected; it goes up to the higher illumination. And this is the means that brings the lamp back down to accent level after a set period of time,

And my analysis of the parties' positions here is that you agree on the structure for this and that it's basically column 4, lines 6 through 12.

And this is K2, and I suspect that the diagram of Dr. Massengill will show that at least his analysis is that the parties have agreed that the on-timer and turn-on inhibit is the structure that supports this function. Does anybody disagree with that?

MS. MITRAKOS: We are quickly scrambling to look for a picture of C2. If you are saying it's the —

THE COURT: Here's C2, and it shows this function. And it's outlined in both red and blue.

MS. MITRAKOS: Yes, you are correct.

MR. COOK: Yes, yes.

THE COURT: And, Mr. Higgins, do I have your agreement on that one?

MR. HIGGINS: You do, Your Honor.

THE COURT: So I don't really need to construe that one.

The next claim is C2 of — as dubbed by Dr. Massengill. That one is delineated in this way: Wherein said control circuit means includes switching means for selectively permitting and preventing the application of said AC voltage to said lamp. So this is basically a switch that allows the lamp to either be on or off.

The plaintiff describes just the triac. The defendant states that the structure to bring about this function, to accomplish this function, needs more than that.

And the Court finds that the structure to bring about this function, accomplish this function, is found in column 5, beginning in line 13 with the sentence, "When the ramp voltage exceeds the threshold voltage," and ends at the beginning of line 25, at the end of the sentence, "also shows the resulting voltage across lamp 18 for a different threshold, T2," that that is the description within the patent specification of the structure to bring about that function.

And the diagram shows that the parties have in common the agreement that the triac is part of this function — part of this structure, and the defense includes what I have described, which is more than just the triac.

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Now, what Dr. Massengill describes as claim C3, once again, I believe the parties are in agreement, and I do not need to construe that claim.

It is worded: Wherein said control circuit means include means for causing said switching means to be actuated for a selected portion of each half wave cycle of said AC voltage.

And I believe that at least according to the testimony of Dr. Massengill and according to my analysis of his testimony and the testimony of the plaintiff witnesses, everyone agrees that C3 includes the phase angle portion block on the — on the description — on the diagram.

And the textual support would be column 5, lines 6 through 16, ending with the sentence, "Input signal is applied to the lamp." Does anybody disagree with that?

MR. HIGGINS: No disagreement, Your Honor.

MS. MITRAKOS: That's correct.

THE COURT: The next claim is Claim E, which is described as means for producing a ramp wave form having for each half wave of said AC voltage a ramp pulse which is initiated in response to detection of the zero crossing point for the half wave.

The function in Claim E is the underlined language after the word "means". The — this is the means for creating a voltage varying at a constant rate for each sign wave having

an electrical link of half a wavelength, and that is initiated at a time corresponding to the zero crossing of the sign wave.

That is the function that we must find the structure for, and the Court finds the structure for that in column 4, lines 55 and 56.

Dr. Carnal, am right about that? It's just those two lines; does that sound right?

DR. CARNAL: That sounds right. I'm sorry, Your Honor. I wasn't following correctly.

THE COURT: You were perhaps zoned out, as I'm sure half the people or more in this room are. It's Claim E, and I believe it's just the two lines. It's the bottom — the last claim on page 11.

DR. CARNAL: Just one moment. Yes, Your Honor.

THE COURT: Just the two lines?

DR. CARNAL: Yes, ma'am.

THE COURT: And I will add to that "and equivalence." I mean "and equivalence" on all of these.

The next claim to be construed is what Dr. Massengill referred to as G, means responsive to said sensor means for causing said first threshold voltage to have a first value in the absence of said predetermined condition and a second

value in response to detection of said predetermined condition.

This is a means for causing the minimum level of voltage to have a first value in the absence of a predetermined environmental requirement and a second value in reaction to the sensing of the motion of a person or object.

The structure that supports this function is found in column 4, lines 38 through 46, 38 through 46 and equivalence. And the illustration shows the elements described in there that would be included.

The next claim to be construed is what Dr. Massengill refers to as H, light sensing means responsive to light external to said apparatus for detecting the presence and absence of daylight.

So the function — this is in Claim 11. The function is for detecting the presence and absence of daylight.

The plaintiff maintains that it is simply the photocell. The defendant maintains that it is the photocell and the resistors.

And the Court finds the defendants' argument more persuasive, that it must include the resistors as well as — for the function here, for the structure. And that structure is set out in column 4, lines 19 and 20, and equivalence.

And the last claim to be construed is what Dr. Massengill refers to as C4, which is in Claim 11, said circuit means

including means responsive to said light sensing means for causing said threshold voltage to have a third value different from said first and second values when said light sensing means is detecting daylight.

So this function is the structure that brings about — that causes the minimum level of voltage to have a third value different from the first and second value when the light sensing means senses the light of day.

So the third value is basically there will be no light being emitted from the device at all when there's the light of day.

And the Court finds that the structure to support that function is found in column 4, line 21. I think it's 21, in the middle. It starts, "The daylight detect and reset portion," and it's just that one sentence that goes from the middle of 21 down to — through 26, That's in Claim 11.

That includes equivalence, and the diagram on C4 shows the difference in the parties' positions of what is included in that structure.

Now, I'm going to go through one more time because I'm not sure I said in what claims — for each of these in what claims this term appears, and I want to make sure that that's very clear.

DR. CARNAL: Your Honor? Your Honor?

THE COURT: Yes?

DR. CARNAL: Forgive me. You asked that question a while ago, and I'm thinking that I got confused about the claim that was at the bottom of page 11.

THE COURT: The one on the bottom of page 11; yeah, I couldn't read my own notations here. Yes?

DR. CARNAL: It's the one that states, "means for producing a ramp wave form reach halfway" —

THE COURT: Did I go on and include — went on to the top of 5?

DR. CARNAL: Well, if I'm — I may have misunderstood you, but I thought you said it only included two lines.

THE COURT: That was my question. I have it highlighted in two colors, so I'm having a hard time figuring out —

DR. CARNAL: According to what I have, it would start in column 4. It's the beginning of the paragraph right after line 55, and it terminates in column 5, line 6.

THE COURT: Good. Okay. Good, that's what I had marked.

DR. CARNAL: Then I misunderstood. I'm sorry, I thought you said it just included two lines.

THE COURT: Well, I had it marked in two different colors, so I appreciate your correcting that because in our discussion about that, I know that you had the same markings. We had corresponding markings, and I wanted to make sure that I had that right. So thank you for that correction.

Now, I'm going to go through, and for the aid of the parties because there were so many claim charts and so many different ways to refer to these various claims, I ended up taking — and these are in the order that they appear in the plaintiff's proposed alternate 112/6 construction, which starts on page 10 of, I believe, the plaintiff's rebuttal brief.

MR. HIGGINS: That's correct, Your Honor.

THE COURT: Okay. So just for ease of reference, that was the chart I started with but then I added the letters that Dr. Massengill gave these claims, but I just want to go through very quickly and say that Dr. Massengill's "I" claim appears in Claim 6; his A claim appears in Claims 9, 10 and 11; his J claim appears in Claim 6. His K1 claim appears in Claim 6. And the C1 claim appears in Claims 9, 10 and 11.

The K — sorry, K2 claim is in — term is in Claim 6. C2 is in Claims 9, 10 and 11. C3 is in 9, 10 and 11. E is in 10 and 11. G is in 10 and 11. H is in 11, and C4 is in 11.

So those are the claim constructions that I have been called upon to make. I will be issuing an order that simply adopts by reference my findings and conclusions announced at the end of this three-day hearing at which I have heard many, many expert witnesses testify.

And the next phase of this case, I suppose, will be dispositive motions. Will we go to that phase?

MR. COOK: I think so.

THE COURT: And I don't believe we've set any deadlines for any of that, have we?

MS. MITRAKOS: We have agreed to deadlines, Your Honor.

THE COURT: Is it a certain number of days after this ruling or something?

MS. MITRAKOS: Yes. Those deadlines did have a provision you taking 60 days to rule. That's what we discussed during the telephone conference.

THE COURT: Okay. So does it state — I should have that in front of me, and I don't. Does the case management order say that the dispositive motions will be filed 60 days after my ruling?

MS, MITRAKOS: First, it's expert reports, and then it's dispositive motions.

THE COURT: Okay. All right. But they are all keyed off a certain number of days after this ruling?

MS. MITRAKOS: That's correct, Your Honor.

Appendix B

THE COURT: So this ruling was made today, so I would start your clocks running today,. And, as I say, I will just be entering a brief order that adopts by reference.

Anything else that we can do today? Thank you all for your excellent presentations. You made something totally incomprehensible to me comprehensible, and I appreciate all your work, and it was — fulfilled its purpose. We are in recess.

[APPENDIX II AND III ARE REPRODUCED IN A SUPPLEMENTAL APPENDIX AT pp. SA12 AND SA19]

APPENDIX C — ORDER OF THE UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF TENNESSEE, NASHVILLE DIVISION DATED OCTOBER 31, 2005

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

Civil No. 3:04-0160
Judge Trauger

DESA, IP, LLC,

Plaintiff,

v.

EML TECHNOLOGIES, LLC and COSTCO WHOLESALE CORPORATION,

Defendants.

ORDER

A *Markman* hearing was held in this case on October 25, 2005 through October 27, 2005. At the conclusion of the hearing, the court announced its decision on the pending issues orally. For the reasons expressed at the close of the hearing, which are incorporated herein by reference as if set forth verbatim, it is hereby **ORDERED** that the claim terms are to be interpreted as "means plus function" terms according to 35 U.S.C. § 112, Sixth Paragraph, and the disputed claim terms are construed in accordance with the court's oral ruling.

Appendix C

It is so **ORDERED**.

ENTER this 31st day of October 2005.

s/ Aleta A. Trauger
ALETA A. TRAUGER
U.S. District Judge

APPENDIX D — EXCERPTS OF TRANSCRIPT OF PROCEEDINGS (MARKMAN) DATED OCTOBER 27, 2005

UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

CASE NO. 3:04-0160
VOLUME III

DESA IP, LLC,

Plaintiff,

vs.

EML TECHNOLOGIES, LLC and
COSTCO WHOLESALE CORPORATION,

Defendants.

TRANSCRIPT OF PROCEEDINGS

BEFORE: THE HONORABLE ALETA A. TRAUGER
DATE: OCTOBER 27, 2005
TIME: 9:00 A.M.

[Commencing at page 478]

* * *

THE WITNESS: All right. Thank you. The following analysis incorporates the master claim chart, the comparison circuit diagrams, the claim key, and the text key.

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My first opinion regarding the structure defining claim element A, sensor means. Claim element A has already been discussed and is reproduced at the top of board A, which we are looking at here.

The written description of the patent identifies two types of predetermined conditions external to said apparatus. One predetermined condition is the preselected level of light incident on a photocell shown in block 56 of [479] the '066 patent, figure 2B, above which the lamp will be off, which can be described as daytime, and below which the lamp will be on, which can be described as nighttime.

It is important to recognize that the circuit could be designed to switch the lamp off as soon as any light falls on the photocell. However, this is not how the circuit of the patent works.

Instead, the circuit does not switch the lamp off until the light falling on the photocell reaches some preselected level, that is the level at which the circuit designers have decided corresponds to the arrival of daytime, that is the end of nighttime.

This level could be selected to be any level of light between full darkness and full daylight, depending upon what the circuit designers may wish to accomplish.

In the patent, the selection circuitry which selects the preselected level of photocell output current in response to which the circuit will switch the lamp from on to off is a voltage divider consisting of two resistors on either side of

the photocell in photocell block 56 of the '066 patent, figure 2B.

THE COURT: All right. Stop. Now, I'm looking at these, and I'm looking at A, and that doesn't seem to correspond with what he just said. So what am I missing? We just haven't finished all of A.

[480] MR. COOK: He's discussing the words —

THE COURT: So we have only gotten part of A?

MR. COOK: Yeah.

THE COURT: All right.

MR. COOK: This is defining the words "predetermined condition". Once that's — those are defined in words, then the whole claim element that uses that phrase is defined by the red block.

THE COURT: Okay.

MR. COOK: So we are getting there.

THE COURT: All right. We're getting there. I'll be patient. Go ahead.

THE WITNESS: The other predetermined condition is the preselected level of change in infrared radiation incident on a pair of PIRs shown as Q1 and Q2 in the '066 patent figure 2A which will cause the lamp to switch from on dim to on bright.

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As with the photocell, it is important to recognize the circuit could be designed to switch that lamp from on dim to on bright as soon as the PIRs detect any change in infrared radiation.

However, as with the photocell, this is not how the circuit of the patent works. Instead, the circuit does not switch the lamp from on dim to on bright until the change in infrared radiation detected by the PIRs meet certain [481] preselected conditions.

That is, the conditions which the circuit designers have decided corresponds to whatever it is they wish to detect.

In the patent, the selection circuitry selects the particular preselected PIR output in response to which the circuit will switch the lamp from on dim to on bright.

This selection circuitry consists of the detector, circuit 43; the turn on inhibit, circuit 46; the amplify and filter, circuit 47; the window comparator, circuit 48; and the pulse count circuit, 51.

One it is understood what is meant by predetermined conditions, we can see that the written description of the patent describes two structures which potentially support the sensor means claim element A of Claims 9, 10, and 11; one, the photocell and its associated selection circuitry; And two, the PIRs and their associated selection circuitry.

Nevertheless, in Claim 11, claim element A, sensor means, cannot be the photocell with or without a selection circuitry for several reasons.

Appendix D

For one thing, if element A included the photocell, this would duplicate that portion of claim element H, light sensing means, which provides that the light sensing means must be responsive to light external to said apparatus.

Moreover, in all the claims where it appears, [482] Claims 9, 10 and 11, if claim element A, sensor means, were construed to encompass the predetermined condition of the photocell, that is nighttime, with or without a selection circuitry, this would be inconsistent with the claim element Cl, which provides that the lamp emits light at said level of illumination in the absence of said predetermined conditions and emits light in said second level of illumination in response to detection of said predetermined condition.

If this clause were construed to apply to the photocell, the first level of illumination would be lamp off. However, this would not satisfy the claim since when the lamp is off, it does not emit light as required by claim element Cl, which appears in each of the Claims, 9, 10 and 11.

As a result, when construed in accordance with 112/6, it's my conclusion that claim element A, sensor means, refers to the PIRs and their associated selection circuitry but not to the photocell and its associated selection circuitry, the structure of which, in my opinion, defines claim element A, sensor means, in accordance with 112/6 is marked in red on circuit diagram A, the structure of which, as understood, Mr. Carlson contends defines this claim element A is marked in blue.

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As shown in diagram A, the Massengill structure [483] encompasses the portion of the '066 figure 2 circuit which monitors external infrared radiation, detects changes in infrared energy and selects those changes that in IR are representative of motion as manifested by a high or low output condition at node A.

Specifically, the output of the selection circuitry associated with the PIRs, Q1 and Q2, labeled mode A, is a signal that is either a high or low voltage; low representing the detection of the predetermined condition, and high representing the absence of the predetermined condition.

By comparison, also shown on board A, the Carlson structure encompasses only the PIRs Q1 and Q2 and the photocell shown in block 56 without any associated selection circuitry for either the PIRs or the photocell.

I believe that the Carlson structure does not define element A for two reasons. The first is that the photocell does not define element A.

I disagree with Mr. Carlson's contention that the structure defining element A includes the photocell for several reasons.

For example, as I have already indicated, inclusion of the photocell in element A would be inconsistent with claim element C1, which requires that the lamp emit light in response to the presence and absence of the predetermined [484] condition, whereas in the absence of the predetermined condition associated with the photocell, nighttime, the lamp remains off.

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In addition, if element A were to include the photocell, this would duplicate that portion of claim element H, light sensing means, which provides that the light sensing means must be responsive to light external to said apparatus.

Even though element H appears only in Claim 11 and not in Claims 10 and 9, claim element A, which is quite lengthy, is identical in all three claims, which makes it appear that the same meaning is intended for element A in all three claims.

The second reason that I believe that Mr. Carlson's structure does not define A is that the 112/6 definition of element A must include selection circuitry.

I disagree with Mr. Carlson's contention that claim element A could include either the PIRs or the photocell without including the selection circuitry associated with these components because neither of these components by themselves detect a predetermined condition.

Mr. Carlson defines the term "predetermined condition" to have the same meaning in Claims 9, 10 and 11 as first predetermined condition and second predetermined condition in Claim 6.

[485] This can be found in Defendants' Exhibit 49, pages 32 through 33.

Claim 6 expressly defines first predetermined condition to mean motion relative to said first sensor means of a person or object separate from said apparatus and second

predetermined condition to mean a predetermined level of light external to said apparatus.

However, as I will explain, PIRs detect changes in infrared radiation, not motion, and photocells detect light, not predetermined levels of light.

That PIRs detect changes in infrared radiation, not motion, cannot be seriously disputed. As indicated in my tutorial discussion, a PIR sensor consists of an insulated material having a polarity which rapidly switches back and forth by 180 degrees when exposed to changes in infrared radiation, producing a characteristic brief pulse of negative going and positive going or the reverse electrical voltage or current, as shown in Mr. Raper's oscilloscope trace at the bottom of page 6 of his statement. This pulse may or may not be caused by the motion of a person or object.

Moreover, in the patented circuit not all pulses produced by a PIR trigger the lamp. Instead, the selection circuitry only triggers the lamp for those PIR signals which have been preselected by the circuit designer to represent [486] whatever it is that the circuit designer intended for the circuit to detect.

Using my SPICE simulations, I have generated a pair of signal plots.

THE COURT: Stop. SPICE simulations. What's that? I'm sorry.

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THE WITNESS: SPICE, Your Honor, is a computer program, a circuit simulation program, that allows one to build a model of a circuit such as shown here and simulate it on the computer and look at particular node voltages and currents.

THE COURT: Okay. Thank you.

DR. CARNAL: SPICE stands for Simulation Program with Integrated Surface Images. They have a variation of it called Nutmeg.

THE WITNESS: Thank you.

THE COURT: These engineers, they have a good sense of humor, okay. Thank you very much.

(Laughter.)

THE WITNESS: And if I could have a board — a signal plot board trigger? Using my SPICE simulation, I have generated a pair of signal plots which illustrate operation of the PIRs in the circuit of the '066 patent.

The first signal plot marked as Defendants' Exhibit 52 Trigger — and that's the board that we're looking at [487] here — illustrates simulated use of the PIRs to turn on the lamp.

Here, the top signals, labeled PIR-1 and PIR-2, show representative PIR voltages of Q1 and Q2 responsive to external stimuli, as described by Mr. Raper's oscilloscope trace of the Heimann model LHI 778 PIR.

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In this simulation, the PIR signals arrive within two seconds of each other. And those signals are shown in the top diagram labeled PIR-1 and PIR 2. They are the signals at the output of the PIR devices arriving approximately two seconds apart in time.

The bottom plot in Defendants' Exhibit 52 shows that signals at the output of the window comparator, which in the '066 figure 2 diagram is block 48, and at the output of the pulse count, which is block 51, measured at node A of the '066 circuit.

So the pulse, the negative going pulses we see here are the output of the window comparator, and this signal that goes low at this point is the output of the pulse counter.

And it is at this point that the predetermined motion has been detected and the lamp will go to bright. Note that the high and low transition in the pulse counter output Node A in response to the arrival of the second pulse signifies that predetermined motion has been detected.

[488] This low signal at Node A then propagates into the logic and lamp control circuitry to cause the appropriate action of the lamp; that is, bright mode if it is nighttime.

Now, if I might have the signal plot board showing no trigger, please.

MR. COOK: Your Honor, this board that we just looked at is at tab 56 in your binder. And the next board is at tab 57.

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THE COURT: Okay.

THE WITNESS: This board illustrates simulated use of the PIRs to detect a change in infrared radiation that does not turn on the lamp. Here the top signals labeled PIR-1 and PIR-2 again show representative PIR voltages of Q1 and Q2 responsive to external stimuli as described by Mr. Raper's oscilloscope trace of the Heimann Model LHI 778 PIR.

In this simulation, the PIR signals arrive within four seconds of each other. So, again, PIR signals, they're spaced further apart in time.

Note that the individual PIR signals in the simulation are identical to the previous simulation; however, they arrive further apart in time.

In the bottom signal plot of this diagram, we see that the window comparator responds to the PIR signals as [489] indicated by the negative pulses at the output of the comparator, which is block 48 of the '066 figure 2. And that's shown by these negative going pulses spaced further apart in time.

However, this particular sequence of PIR signals is outside the bounds of what the circuit was designed to interpret as the first predetermined condition; that is, motion of a person or object.

Because the PIR signals do not arrive within the preselected time interval, the circuit does not regard them as representing the prescribed motion.

As a result, the pulse counter output, Node A, does not change, that is, it not triggered, and the lamp control circuitry will not respond.

And that's shown by a solid line at the top here that does not go low, it stays high, and the lamp will not go into bright mode.

These two simulation experiments clearly show that there are PIR signals in response to IR detection that are selected by the '066 figure 2 circuitry in blocks 43, 46, 47, 48, and 51 as representative of prescribed motion, that is the trigger signal plots of Exhibit 52.

And there are other PIR signals in response to IR detection that are not selected as representative of prescribed motion, the no trigger signals plots of Exhibit [490] 53.

Because of the clear delineation and function between PIRs which detect changes in infrared radiation and PIRs with appropriate selection circuitry which detect motion, I would be surprised to see industry usage referring to PIRs as, quote, motion detectors.

Material collected from various web sites bear this — bears this out.

Defendants Exhibit 54 is a collection of product literature for PIRs which illustrate the PIRs as electrical circuit components and refers to PIRs only as infrared radiation detectors but not motion detectors.

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On the other hand, Defendants' Exhibit 55 is a collection of product literature for PIR based motion detectors which are not circuit components but completed circuits contained in housings containing not just PIRs but associated electrical circuitry, a number of which were also said to employ pulse counting.

MR. COOK: Your Honor, those are tabs 58 and 59. In other words, Exhibits 54 and 55 are 58 and 59 in the binder.

THE WITNESS: It is also my opinion that if element A were construed to include a photocell, which it should not be for reasons I have previously explained, then element A must also be defined to include the photocell's [491] associated selection circuitry.

As I have already discussed, the presence of the term "predetermined condition" in element A as applied to the detection of a particular level of light by a photocell requires additional circuitry, not just a photocell.

Photocells only detect light, whereas selection circuitry is needed to detect a particular level of light.

* * *

[515] * * *

BY MR. HIGGINS:

Q Now, is it your opinion that people skilled in the [516] art to which this patent pertains would not understand what a photocell was in this context?

A A person skilled in the art would absolutely understand what a photocell means.

Q At column 4 of the patent, particularly at line 18, it discusses the operation and output of a photocell. It says, a photocell 56 detects the presence or absence of daylight.

Is it your opinion that people skilled in the art of the '066 patent would understand that just a photocell would detect the presence or absence of daylight?

A A person skilled in the art would understand that a photocell is a light sensitive device, and it could be used in that way, certainly.

THE COURT: Without resistors?

THE WITNESS: It would depend, Your Honor, on the designer's desire of what he wants to define as daylight.

THE COURT: Okay.

THE WITNESS: For example, the room light in here might trigger the photocell; it might not, depending on the designer's choice.

BY MR. HIGGINS:

Q Now, in Mr. Raper's demonstration, he had a little wire nut, a little cap, that he put over the photocell to [517] simulate nighttime, and then you saw the signal change, didn't you?

A I did.

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Q And then he took his hand and he put it in and out, closer and farther away from the bare photocell, and the signal changed there too, didn't it?

A It did.

Q So wasn't that gizmo, that little photocell on his PIR photocell board, detecting the presence or absence of daylight?

A It was being modulated by the amount of light as he moved his hand back and forth, so there was a continuously output voltage that was changing with the level of light.

Now, what particular voltage is representative of daylight in that demonstration, I don't know.

Q Now, the patent at column 4 goes on to say, a photocell detects the presence or absence of daylight and has an output. Do you see that?

A Yes.

Q Once the photocell has detected, it produces an output, correct?

A Correct.

Q And then at that output, it says it's coupled to a daylight and reset portion 57 of the circuit.

A Correct.

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[518] Q Correct? So that the daylight and daylight detect and reset portion, 57, that is shown on figure 2A, is of the circuit and not of the sensor, the photocell sensor. Isn't that what the patent says?

A I'm sorry. I was looking at my diagram. The last sentence you said Mr. Higgins?

Q Photocell 56 detects the presence or absence of daylight and has an output —

A Correct.

Q — coupled to a daylight detect and reset portion 57 of the circuit?

A Correct.

Q So the photocell is the sensor there, correct?

A The photocell is the sensor, yes.

Q Okay. And the daylight and detect reset portion 57 is of the circuit and not of the sensor, correct?

A That's — yes, and that's the way I've identified it on these diagrams.

Q If I could return you to Mr. Raper's demonstration with respect to the PIR?

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It's correct, isn't it, that Mr. Raper's little simple board, the bare PIR did detect motion of a person or an object, didn't it?

A Not to argue with you, Mr. Higgins, but there were other components on his, quote, bare PIR board there. There [519] were two resistors and a capacitor.

Q And you are saying that those resistors and capacitors were something other than what Mr. Raper testified as to put the ordinary bias on —

A No, you are — like I said, I'm not trying to be argumentative; you are exactly correct. Those were components necessary to bias the device in its operating mode.

Q And isn't that the way that most sensors are; they have to be biased in order to be —

A That's correct.

Q — sensitive to whatever they are asked to sense?

A That's not true of sensors in general. It's true of semiconductor devices in general, and the PIR is a semiconductor device. For example, the photocell does not need to be biased.

Q So you would agree with me that the bare PIR that was on the — Mr. Raper's demonstration as biased is an ordinary PIR just sensing, correct?

A Just sensing, yes, sir.

Q And you saw him wave his hand over that PIR, and what did you observe?

A The output voltage on the oscilloscope was changing, was modulated.

Q Now, isn't that detecting motion?

[520] A Actually, Mr. Higgins, the PIR was responding to the heat signature in Mr. Raper's hand, and it was the heat changing that it was responding to, which was caused by the motion, of course. But it's responding to the heat signature.

Q So is it important to you that there's a difference between being responsive to changes in incident infrared energy and motion? Are those different to you as a person testifying in this Court?

A I'm just trying to be as precise as possible with the words we use.

Q Okay.

THE COURT: Heat sounds pretty different from motion to me.

MR. HIGGINS: Well, but, Your Honor, that's — may I respond?

THE COURT: No, this isn't argument.

MR. HIGGINS: Thank you. Very well.

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BY MR. HIGGINS:

Q But when a PIR senses heat — changes in heat, that's saying — that is occurring as a result of the motion of a person or object, isn't it?

A That can occur as a result of motion of a person, certainly.

Q So the PIR is detecting, technically speaking, as [521] you just said, the changes in incident infrared energy, heat, and that change is produced by the motion of the person or object relative to that sensor, isn't it?

A The example that you just gave is true.

Q And if Mr. Raper held his hand over the sensor without motion, it wouldn't detect it, would it?

A No, it would not because a PIR is only sensitive to changes in infrared energy, not incident infrared energy.

Q And the changes occur when there is motion?

A Motion can cause changes in infrared signature, certainly.

THE COURT: Wouldn't the act of bringing the hand into the ambit of the PIR cause some reaction? Because there certainly is motion bringing the hand in.

THE WITNESS: Yes, Your Honor. If there's —if the hand moves toward the PIR, there would be some change in background infrared.

It would be — there would still be a signature involved with that, some change in background infrared energy.

THE COURT: But it is really reacting because of the motion, as he is saying?

THE WITNESS: Well, motion is causing the change in infrared energy, and that's what the PIR senses.

THE COURT: Okay.

[522] THE WITNESS: So it's kind of a two-step process. There's motion of a warm body that's changing relative to the background; PIR is sensing the infrared signature of that.

THE COURT: Okay.

* * *

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[572] * * *

THE COURT: All right. Any redirect?

MR. COOK: Yes.

REDIRECT EXAMINATION

BY MR. COOK:

Q Dr. Massengill, first with regard to the issue of heat versus motion versus changes in heat or changes in infrared energy, if you had a stationery object and sat it in front of the PIR and then heated it up rapidly, would that cause the PIR to give a signal?

A Yes, it would.

Q And would that be without regard to whether or not it was in motion?

A That would be without regard to motion.

Q Does the PIR respond just to motion which causes changes in infrared radiation or to other types as well?

A It responds to motion that causes change of infrared radiation.

* * * *

APPENDIX E — STATEMENT OF PROFESSOR LLOYD MASSENGILL UNDER LOCAL RULE 12(C)(6)(C) DATED APRIL 12, 2005

UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF TENNESSEE
NASHVILLE DIVISION

Civil Action No. 3-04-0160
Judge Aleta A. Trauger
Magistrate Judge Joe B. Brown

DESA IP, LLC,

Plaintiff,

v.

EML TECHNOLOGIES, LLC and
COSTCO WHOLESALE CORPORATION,

Defendants.

STATEMENT OF PROFESSOR LLOYD MASSENGILL UNDER LOCAL RULE 12(C)(6)(C)

[Table of Contents intentionally omitted]

Appendix E

I. PERSONAL AND PROFESSIONAL BACKGROUND

I am a professor of Electrical Engineering and Computer Engineering at Vanderbilt University in Nashville, Tennessee. I am also the founding Director of Engineering for the Vanderbilt Institute for Space and Defense Electronics (ISDE), where I direct all electronic modeling, analysis, and design for various government- and corporate-funded engineering activities. I am a Fellow of the Institute of Electrical and Electronics Engineers.

I hold Ph.D., M.S., and B.S. degrees in Electrical Engineering from North Carolina State University and have worked at Vanderbilt University since 1987. I have taught undergraduate and graduate courses in microelectronic circuit analysis, analog circuit design, digital logic, digital circuit design, computer-aided design, and basic electrical engineering theory. I have performed research in microelectronic circuit analysis and design for military and space systems, including the U.S. Navy, U.S. Air Force, the Defense Threat Reduction Agency, DARPA, and NASA; I have worked on commercial electronics design with BAE system, Compaq Computer, Boeing Aerospace, Hughes Aerospace, Harris Semiconductor, Lockheed Martin Aerospace, and Texas Instruments; and I have over 100 technical publications in electronic theory, analysis, and design. I hold a DOD Secret security clearance.

A copy of my curriculum vitae is provided, as Defendants' Exhibit 43.[1]

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1. All exhibits are attached to the Declaration of Roger L. Cook In Support Of Written Markman Testimony ("Cook Decl.") filed herewith.

Appendix E

I have been asked to study the Wiesemann patent (U.S. Patent Number 5,598,066 - the " '066" patent) in order to contribute to what has been explained to me as Markman proceedings or claim construction.

II. TOPICS ADDRESSED AND BASIS FOR OPINIONS.

A. Topics Addressed.

My presentation is divided into three sections. First, I supplement the technical tutorials provided by other witnesses.

Second, I address whether or not the structural language in each of the twelve claim elements which contain the word "means" followed by a statement of function ("means plus function" format) recite sufficient structure to perform the function stated in the claim element. As advised, this is the test for determining whether or not those "means plus function" claim elements must be interpreted in accordance with 35 U.S.C. § 112 ¶6. In my opinion, none of the twelve claim elements recite sufficient structure to perform the recited function. My opinion here is largely consistent with Desa's expert witness Steven Carlson, who only found one claim element that recited sufficient structure to perform the recited function.

Third, as advised, claim elements construed in accordance with § 112 ¶6 are interpreted to mean the corresponding structure set forth in the written description (including drawings) of the patent, and equivalents thereof. Accordingly, as to the claim elements which I have concluded

must be interpreted in accordance with §112 ¶6, I have determined and identified which portions of the written description correspond to, and therefore define, those claim elements.

In this respect, as advised, and as is evident from my reading of the corresponding written statements of Desa witnesses Carlson, Raper and Paulus, there is a sharp dispute between the parties as to whether the term "sensor means for detecting a predetermined condition external to set apparatus" (or "first sensor means for detecting a first predetermined condition external to said apparatus"), as relates to the use of passive infrared sensors ("PIRs") in the detection of motion, should be interpreted to mean just the PIRs (Desa's interpretation) or to mean the PIRs in combination with what I refer to as the "selection" circuitry (the detector 43, turn on inhibit 46, amplified and filter 47, window comparator 48 and pulse count 51) which determines which signals output by the PIRs are the result of a "predetermined condition" i.e. a preselected change in infrared radiation incident upon the PIRs.

For reasons I shall explain in greater detail herein, I am of the opinion that Defendants' "sensor means . . ." and "first sensor means. . ." interpretations are correct; however, even if Desa were correct that the selection circuitry is not part of the "sensor means," but instead is part of the "control circuit means," the net result would be the same, i.e. that the "selection" circuit elements are necessarily included in each of the asserted claims 6, 9, 10 and 11, since "control circuit means" claim elements *are present in each of claims 6, 9, 10 and 11.*

Finally, I will comment on points of disagreement between my analysis and that of Desa's witnesses. In particular, I will

explain why I believe I have correctly identified the circuit elements which support the various means plus function claim elements and sub-elements and, to the extent we differ, why I believe the circuit elements selected by Mr. Carlson (on behalf of Desa) are incorrect.

B. Basis for Opinions.

In the following analysis, my opinions, including whether or not the claim elements recite sufficient structure to avoid §112¶6, and as to what constitutes the supporting structure for each of the claim elements, are based upon 1) my understanding of the '066 patent including its textual written description, claims and drawings, particularly including the schematic circuit diagram of Figures 2A and 2B; 2) portions of the deposition testimony and exhibits in this case; 3) the written statements of the witnesses in this case, Messrs. Raper, Carlson, Paulus, Patterson, Evans, and Thesz; 4) my review of the Markman briefs in this case, and some of the supporting exhibits; 5) my examination and operation of Mr. Evans test circuit built in accordance with the disclosure of the '066 patent; 6) my simulation of the '066 patent circuit prepared in accordance with the disclosure of the '066 patent; and 7) my skill, training and experience particularly including my 23 years of experience as an electrical engineer.

III. CHARTS AND GRAPHICS.

A. Appendix A: Master Claim Chart.

For ease of reference, Appendix A is a Master Claim Chart (marked as Defendants' Exhibit 44) which assigns each claim element and sub-element in dispute a reference letter (A, B, C,

etc.) and a reference name (Sensor Means, etc), identifies the structural and functional language in each "means plus function" claim element and sub-element, and states my opinion as to whether or not the structural language recites sufficient structure to perform the stated function, in order to overcome the presumption that 35 U.S.C. §112 ¶6 applies.

B. Appendix B: Comparison Diagrams.

For ease of reference, and to highlight the area of dispute, as to each claim element and sub-element which I believe is governed by 35 U.S.C. §112 ¶6, Appendix B (marked as Defendants' Exhibit 45) is a set of schematic circuit diagrams (copies of Figures 2A and 2B of the '066 Patent) marked to show which portions of the '066 circuit diagram, Mr. Carlson (for Desa) and I (for EML) contend correspond to each claim element and sub-element.

C. Appendix C: Claim Key.

For ease of reference, Appendix C (marked as Defendants' Exhibit 46) is a photocopy of the '066 Patent claims, with each claim element and sub-element of disputed claims 6, 9, 10 and 11 marked and labeled with the appropriate reference letter from the Master Claim Chart.

D. Appendix D: Text Key.

For ease of reference, Appendix D (marked as Defendants' Exhibit 47) is a photocopy of the '066 Patent text, with the text I believe corresponds to each claim element and sub-element marked and labeled with the appropriate reference letter from the Master Claim Chart. I have marked the text I have selected

in red. To highlight the points where Mr. Carlson and I differ, the text Mr. Carlson has selected for each claim element and sub-element is marked in blue.

IV. BACKGROUND.

A. Technical Tutorial.

This supplements the technical tutorial information provided by Dr. Paulus and Mr. Carlson.

1. Photosensor

A photosensor consists of a material (such as cadmium sulfide — CdS) which changes its electrical resistance when exposed to photons (light). Within its range of sensitivity, a photosensor will have a relatively high resistance in complete darkness. That resistance will decline continuously in response to increasing levels of illumination, and have a relatively low resistance when exposed to bright illumination.

In Figure 2 of the '066 patent drawings, the symbol for the photosensor is as follows:

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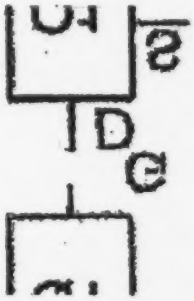
2. PIR Sensor

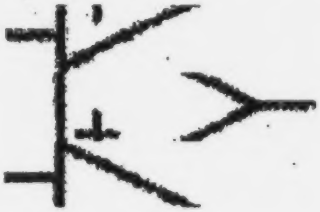
A passive infrared ("PIR") sensor consists of an insulator material which has a particular polarity, which polarity rapidly switches back and forth by 180^0 when exposed to changes in infrared radiation. This rapid change in polarity produces a characteristic brief pulse of negative-going then positive-going (or positive-going than negative-going) electrical voltage (or current). The oscilloscope trace shown in the screen capture at the bottom of page 6 of Mr. Raper's testimony (which begins at a particular background level of voltage, goes negative for a few milliseconds, then positive for a few more milliseconds, and then returns to the background level) is characteristic of the signal produced when a PIR is exposed to a change in infrared radiation.



3. Operational Amplifier ("Op Amp")

An operational amplifier can be used either as an amplifier or a digitizer. As an amplifier, one can produce a large output signal in response to a small input signal. Nonetheless, because its output signal cannot exceed the voltage to which it is connected, an op amp can also be used as a digitizer. In other words, if its input signal is below a

certain level, it will produce an output signal of zero volts whereas, if its input signal is above that level it will produce an output signal equal to the voltage to which it is connected. Where, as in some of the circuits of the patent, an op amp is connected to a constant voltage of 5 volts (sometimes referred to as the "rail voltage"), the output of the op amp will be either 0 volts or 5 volts, thereby providing a "digital" output signal which can be used to represent "yes" or "no" in a logic circuit.



B. The '066 patent

The '066 patent describes a security lighting system that is sensitive to prescribed motion (e.g. a person) but insensitive to non-prescribed motion (e.g. background interference, trees, small animals, etc) and actuates a security light in response. The patent describes various operational features such as a dim illumination (or "accent") baseline mode and a bright illumination activated mode, the use of passive infrared (PIR) sensors for motion sensing, a user-selectable dim versus off background mode, a user-controlled manual override feature to force bright illumination, a timing feature to maintain bright illumination for a period of time following activation, and an automatic photosensor-based override function to disable illumination during the day.

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C. Claims 6, 9, 10 and 11 Of the '066 Patent.

The claims under consideration are claims 6, 9, 10 and 11. As set forth in the table below, these claims consist of various combinations of 15 different claim elements: A- K(2).

Claim 11, with nine claim elements, contains the largest number of common claim elements. The elements which make up claims 9 and 10 are subsets of the elements of claim 11. Accordingly, claim 11 is a convenient starting point for analysis.

Claim 6 consists of four elements, none of which are identical to any of the elements of claims 9, 10 and 11. On the other hand, claim 6 element I is nearly identical to claim element A in claims 9, 10 and 11; and claim element K(1) is quite similar to claim element C(1) of claims 9, 10 and 11, since elements A and I include the common phrase "sensor means for detecting a . . . predetermined condition external to said apparatus", and elements C(1) and K(1) include the common phrase "control circuit means . . . for causing said lamp to emit [bright light] in response to detection of said predetermined condition."

As advised, these two pairs of nearly identical claim elements, A/I and C(1)/K(1), underlined in the table below, have generated the greatest debate in the Markman briefing and testimony. Part of the debate is whether or not these two pairs of claim elements must be construed in accordance with 35 U.S.C. §112 ¶6. I have expressed element by element opinions on this issue in Section V herein. The means plus function claim elements are identified with bold typeface in the table below.

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The other part of the debate is, if the means plus function claim elements must be construed in accordance with §112 ¶6, what is the corresponding structure in the patent which defines those claim elements. I have expressed element by element opinions on this subject in Section VI herein.

All of my opinions are summarized in the Master Claim Chart, Appendix A, and the Comparison Diagrams, Appendix B.

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CLAIM ELEMENTS

CLAIM NO.	A	B	C(1)	C(2)	C(3)	C(4)	D	E	F	G	H	I	J	K(1)	K(2)
11	X	X	X	X	X	X	X	X	X	X	X				
10	X	X	X	X	X		X	X	X	X					
9	X	X	X	X	X										
6												X	X	X	X

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D. SPICE Simulation of the '066 Patent Circuit.

1. Preparing the SPICE Simulation.

I have carefully studied the '066 patent drawing from my knowledge of basic electrical circuit design and circuit operation. I have also implemented portions of the '066 circuit structure of '066 Fig 2 using the industry-standard circuit simulation software PSPICE v8.0 from Cadence Design Systems Inc. This software is a preeminent analysis tool used by circuit designers worldwide to verify expected circuit operation and to simulate the impact of design modifications. I use (or direct the use of) this tool on a frequent basis in my Vanderbilt classes, in my research activities with government sponsors, as well as in my engineering oversight duties at the Vanderbilt Institute for Space and Defense Electronics. SPICE provides a highly-accurate representation of the operation of a circuit.

I have also examined the test board constructed by Scott Evans, including his circuit schematics, and the Statement of Scott Evans Under Local Rule 12(C)(6)(C) ("Evans Statement").

2. The SPICE Simulation of the PIRs, Their Selection Circuitry, and Control Logic.

Defendants' Exhibit 48 shows signal plot results of my SPICE circuit simulation of the '066 Fig 2 circuit from the PIR input devices through the voltage threshold at Node 61. The simulations were performed using representative PIR input signals of Q1 and Q2 as described by Mr. Raper's oscilloscope trace of what he described as a "Heimann model LHI-778" PIR.

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The first signal plot shows the PIR signals at Q1 and Q2 representative of the detection of some change in external IR radiation, such as a person walking before the apparatus.

The second signal plot shows the output of the Detector (block 43 in the '066 Fig 2 circuit). Note that the detector signal is quite small as it has not yet been significantly amplified. The larger signal is the output of the Amplify and Filter (block 47 in the '066 Fig 2 circuit). Here the signal has been amplified and further filtered as part of the circuit's "selection" process for "predetermined" motion. Also note that both of these signals are analog (continuously variable).

The third signal plot shows the output of the window comparator (block 48 in the '066 Fig 2 circuit). Note that, as described in the '066 patent description, the window comparator output manifests as negative-going pulses in response to the analog signal emanating from the Amplify-Filter block. The third signal plot also shows the output of the pulse count block (block 51 in the '066 Fig 2 circuit, labeled "Node A" in Figure 1, *infra*). As described in the '066 patent description, the pulse count circuitry responds to multiple pulses in such a way as to reduce the probability of false triggering by motion that is not prescribed. The output of the pulse count block (Node A) is a digitized signal which is HIGH when no prescribed motion is detected and LOW when prescribed motion is detected. In the simulation plots, we see a HIGH-to-LOW transition (signifying that the circuit has "selected" prescribed motion) at about 3.8 second in response to the second window comparator pulse.

The fourth signal plot shows the output of the timer block (block 52 in the '066 Fig 2 circuit). This is a digital (HIGH or LOW) signal representing when the lamp should be in the

BRIGHT mode following prescribed motion detection. Note that the signal remains HIGH even after the motion has ceased. As described by the '066 patent, the length of time this signal will remain high (and thus, the lamp will be in BRIGHT mode) is user selectable via the multi-position switch shown in block 52.

The fourth signal plot also shows the signal voltage at Node 61 in the '066 Fig 2 circuit. This signal is described in the '066 patent as the "voltage threshold" which, in combination with the ramp generator and the phase angle blocks, appropriately gates the current to the lamp so that a "DIM mode" and a "BRIGHT mode" are established.

V. IN THE MEANS PLUS FUNCTION CLAIM ELEMENTS IN '066 PATENT CLAIMS 6, 9, 10 AND 11, THE RECITED STRUCTURE IS INSUFFICIENT TO PERFORM THE STATED FUNCTION.

I have been asked to address the "means plus function" claim elements. As advised those are the claim elements which include the word "means" followed by a statement of function, usually introduced by the word "for." Thus, the means plus function claim elements in the asserted claims 6, 9, 10 and 11 are the claim elements identified by reference letters A, C(1), C(2), C(3), C(4), E, G, H, I, J, K(1), K(2) in the Master Claim Chart, Appendix A.

As advised, a patent applicant who submits a claim element in "means plus function" format is presumed to have invoked examination of that claim element under §112 ¶6; this presumption can only be overcome if the recited structure

is sufficient to perform the entire stated function; and the party seeking to overcome the presumption (in this case, Desa) has the burden of proof.

In my opinion, applying the foregoing rules to the means plus function claim elements in claims 6, 9, 10 and 11, all of those claim elements fail to recite sufficient structure to perform the entire stated function. The reason for my opinion is set forth in the following discussion.

A. Claim Elements A and I ("Sensor Means" and "First Sensor Means") Recite Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element A is as follows:

> sensor **means for** detecting a predetermined condition external to said apparatus;[2]

and Claim Element I is

---

2. In the quoted means plus function claim elements, the words "means" and "for" are in boldface type; the words which relate to structure [including location and response] are underlined; and the functional statements are italicized. This coding of the means plus function language has been provided by counsel and, as advised, corresponds to the coding of relevant parts of these claim elements employed in the PowerPoint attached to the Statement on Steven B. Carlson under Local Rule 12(c)(6)(c) ("Statement"). As advised, a copy of the Carlson Statement was marked as Defendants' Exhibit 11 to the Carlson deposition and, during the deposition, for ease of reference, page numbers were applied to previously unnumbered pages of Mr. Carlson's PowerPoint presentation which had been attached to the end of Mr. Carlson's Statement. As advised, Defendants' Exhibit 50 is a copy of the marked-up version of Mr. Carlson's statement.

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first sensor **means for** *detecting a first predetermined condition external to said apparatus, said first predetermined condition being motion relative to said first sensor means of a person or an object separate from said apparatus*

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that, as to Claim Element I, the word "sensor" [or "sensor means"] did not recite sufficient structure to perform the stated function of the claim element (in italics). Defendants' Exhibit 49, deposition page 42, line 6-page 47, line 3. See also Defendants' Exhibit 50 at page 14. According to Mr. Carlson, not just any sensor would be sufficient to perform the stated function: "There are many types of sensors: Light, heat, temperature, pressure, rotation, position, voltage, current, magnetic field, too many to enumerate." Id., Exhibit 49 at page 42, lines 6-14. Not all of these would serve. Id. at deposition page 42, line 21, page 43, line 1. Instead, "[y]ou would need a sensor that had an output that could be correlated to motion in some way." Id.

I agree with the foregoing statements by Mr. Carlson. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would perform the entire stated function of this claim element. Accordingly, I agree with Mr. Carlson that the term "first sensor means" does not recite sufficient structure to perform the stated function of Claim Element I.

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My opinion in this respect is further supported by the statement of Michael Thesz, which I understand is being filed contemporaneously with this statement. On page __ of his statement, Mr. Thesz provides a table of examples of patent claim elements which have been held to have sufficient structure and insufficient structure. I note that, as a general rule, the structural language in the claim elements which were held to have sufficient structure allowed me to envision a specific structure. For example, in Mr. Thesz's example of a claim for training pants, the claim element

> "perforation **means** extending from the leg band means to the waistband means through the outer impermeable layer means *for removing the training pants in case of an accident by the user*,"

which was held to have sufficient structure, allows me to envision a specific perforation structure for the training pants. By comparison, the structural language in the claim elements which were held to have insufficient structure did not allow me to envision a specific structure. For example, in Mr. Thesz's example of a claim for a vending machine, the claim element

> "spring **means [for]** *tending to keep the door closed*,"

which was held to have insufficient structure, does not allow me to envision a specific spring structure. When I compare those exemplary claim elements to claim element A of the '066 Patent, I find that the phrase "sensor means" is not analogous to the sufficient structure claim elements in the

left-hand column of Mr. Thesz's table in that it does not permit me to envision a specific structure. Instead, I find Claim Element A, "Sensor Means" directly analogous to the claim element "spring means tending to keep the door closed" which was held to have insufficient structure.

As advised, in his deposition, Mr. Carlson stated that his definitions in claim 6 for both the "first and second sensor [means]" would apply in the ["sensor means" claim elements of claims] 9, 10 and 11, thereby indicating that the "sensor means" element A of claims 9, 10 and 11 lack sufficient structure for the same reason as element I of claim 6. I am also of the opinion that the term "sensor means" does not recite sufficient structure to perform the stated function of Claim Element A, regardless of whether detecting the "predetermined condition" requires use of a PIR or a photocell. If detecting the "predetermined condition" requires use of a PIR, then "sensor means" does not recite sufficient structure to perform the stated function of Claim Element A, for the identical reasons given above for Claim Element I.

If detecting the "predetermined condition" requires use of a photocell, then "sensor means" does not recite sufficient structure to perform the stated function of Claim Element A for the identical reasons given below for Claim Element J, "Second Sensor Means."

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B. Claim Element J ("Second Sensor Means") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element J is as follows:

> Second sensor **means for** *detecting a second predetermined condition, said second predetermined condition being a predetermined level of light external to said apparatus*

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that, as to Claim Element J, for the same reasons as Claim Element I, the phrase "second Sensor means" did not recite sufficient structure to perform the stated function of claim element J (in italics). Defendants' Exhibit 49, deposition page 50, line 6 -page 52, line 7. See also, defendants' Exhibit 50 at page 15.

I agree with Mr. Carlson, for the same reasons. There are any number of structures which might meet the structural language recited in this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural language of Claim Element J does not allow me to envision a specific structure. Similarly, Claim Element J is far more analogous to Mr. Thesz's examples of claim elements which have been held to have insufficient structure, than to his examples of claim elements which have been held to have sufficient structure.

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C. Claim Sub-Element C(1) Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element C(1) is as follows:

> control circuit **means** coupled to said lamp and responsive to said sensor means **for** *causing said lamp to emit light at said first level of illumination in the absence of said predetermined condition*, and **for** *causing said lamp to emit light at said second level of illumination in response to detection of said predetermined condition*, wherein said control circuit means is powered by an AC voltages, and

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that Claim Element K(1) recited insufficient structure to perform the stated function. Defendants' Exhibit 49, deposition page 47, line 4 - page 50, line 5. I agree with Mr. Carlson for the same reasons given by Mr. Carlson.

While Mr. Carlson did not specifically comment on element C(1),[3] for purposes of the "sufficient structure" analysis, for reasons given below, there are no material differences between Claim Element K(1) and claim element C(1).

---

3. Mr. Carlson did not construe or comment on element C(1) in his Statement, including in his Power Point. See Defendants' Exhibit 50. Presumably he intended his construction and comments on element K(1) to apply to element C(1). As explained herein, for purposes of "sufficient structure" analysis, elements C(1) and K(1) are equivalent.

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Claim Element K(1) is as follows:

> control circuit **means** coupled to said lamp and responsive to said first and second sensor means **for** *causing said lamp to emit light at said first level of illumination in response to said second predetermined condition in the absence of said first predetermined condition, and* **for** *causing said lamp to emit light at said second level of illumination in response to detection of said first predetermined condition,*

One difference between Claim Elements K(1) and C(1) is that Claim Element C(1), which expressly refers to the second predetermined condition (nighttime)[4], expressly calls for the first (dim) level of illumination given off by the lamp to be in "response to [detection of the] second predetermined condition [nighttime]" by the photocell, whereas Claim Element K(1), which does not refer to the second predetermined condition, assumes that the photocell has detected nighttime. As a result, in this respect, for purposes of this analysis, Claim Elements K(1) and C(1) are equivalent.

---

4. In the Markman briefing Defendants construed the second predetermined condition to mean daylight, based on the dictionary definition of "light." As advised, to minimize disputes, Defendants withdraw that contention and agree with Desa's interpretation of "second predetermined condition" as "nighttime." As a result, as advised, Defendants withdraw their contention that claim element C(l) is fatally indefinite. As advised, to avoid confusion and minimize dispute, to the extent this Statement is inconsistent with any prior claim interpretation by Defendants, the interpretation herein shall supercede.

The other difference between elements K(1) and C(1) is that C(1) calls for the control circuit to be powered by an AC voltage. Here again, this difference does not affect the outcome of the "sufficient structure" analysis since it is the control circuit which lacks sufficient structure, not its power source.

Accordingly, for the same reasons that I agree with Mr. Carlson that Claim Element K(1) does not recite sufficient structure to perform the stated function, I am of the opinion that Claim Element C(1) does not recite sufficient structure to perform the stated function. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural language of Claim Element C(1) is quite general, and does not allow me to envision a specific structure. Similarly, Claim Element C(1) is far more analogous to Mr. Thesz's examples of claim elements which have been held to have insufficient structure, than to his examples of claim elements which have been held to have sufficient structure.

D. Claim Sub-Element C(2)("Switching Means") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6:

Claim Element C(2) is as follows:

> wherein said control circuit means includes switching **means for** *selectively permitting and preventing the application of said AC voltage to said lamp*

See APPENDIX A, Master Claim Chart.

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In his deposition, Mr. Carlson conceded that Claim Element C(2) did not recite sufficient structure to perform the stated function of claim element C(2). Defendants' Exhibit 49, deposition page 56, line 20 - page 59, line 3. See also, defendants' Exhibit 50 at page 23. According to Mr. Carlson, there are a vast array of switches. Id. Not just any switch would be sufficient to perform the stated function of the claim element. Id. Accordingly, Mr. Carlson is of the opinion that the structural language of this claim element does not recite sufficient structure to perform the stated function. Id.

I agree with Mr. Carlson, for the same reasons. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural language of Claim Element C(2) is quite general, and does not allow me to envision a specific structure. Similarly, Claim Element C(2) is far more analogous to Mr. Thesz's examples of claim elements which have been held to have insufficient structure, than to his examples of claim elements which have been held to have sufficient structure.

E. Claim Sub-Element C(3) ("Means for Causing Switching Means to Be Actuated") Recites Insufficient Structure To Avoid Interpretation under §112¶6.

Claim Element C(3) is as follows:

> [wherein said control circuit includes] **means for** *causing said switching means to be actuated for*

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a selected portion of each half wave cycle of said AC voltage, said portion of said half waves being greater for said second level of illumination than for said first level of illumination

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that Claim Element C(3) did not recite sufficient structure to perform the stated function. Defendants' Exhibit 49, deposition page 59, line 3 - page 60, line 24. See also, Defendants' Exhibit 50 at page 24. According to Mr. Carlson, there are an "infinite number of [control circuits]." Id. Not all of these control circuits would perform the stated function. Id. "Control circuit means" encompasses an infinite number of structures, but by itself does not recite sufficient to perform the stated function. Id.

I agree with Mr. Carlson, for the reasons he has given. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural language of Claim Element C(3) is quite general, and does not allow me to envision a specific structure. Similarly, Claim Element C(3) is far more analogous to examples of claim elements which have been held to have insufficient structure, than to examples of claim elements which have been held to have sufficient structure.

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F. Claim Sub-Element C(4) ("Means Causing Threshold to Have Third Value") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element C(4) is as follows:

> [said control circuit means including] **means** responsive to said light sensing means **for** *causing said threshold voltage to have a third value different from said first and second values when said light sensing means is detecting daylight*

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that, Claim Element C(4) did not recite sufficient structure to perform the stated function. Defendants' Exhibit 49, deposition page 74, line 10 - page 76, line 14. See also, defendants' Exhibit 50 at page 28.

According to Mr. Carlson, there are a "variety of different structures" described by the structural language; however, not all of those structures perform the stated function. Id. Mr. Carlson is of the opinion that this claim element recites insufficient structure to perform the stated function. Id.

I agree with Mr. Carlson, for the reasons he has given. There are any number of structures which might meet the structural language recited in this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural

language of Claim Element C(4) quite general, and does not allow me to envision a specific structure. Similarly, Claim Element C(4) is far more analogous to examples of claim elements which have been held to have insufficient structure, than to examples of claim elements which have been held to have sufficient structure.

G. Claim Element E ("Means for Producing Ramp Waveform") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element E is as follows:

> **means for** *producing ramp waveform having for each half wave of said AC voltage a ramp pulse which is initiated in response to detection of the zero crossing point for the half wave*

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that Claim Element E did not recite sufficient structure to perform the stated function. Defendants' Exhibit 49, deposition page 60, line 25 - page 61, line 5. See also, defendants' Exhibit 50 at page 25.

I agree with Mr. Carlson. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural language of Claim Element E is quite general, and does not allow me to envision a specific

structure. Similarly, Claim Element E is far more analogous to examples of claim elements which have been held to have insufficient structure, than to examples of claim elements which have been held to have sufficient structure.

H. Claim Element G ("Means for Causing Threshold to Have First and Second Values") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element G is as follows:

> [claim 10] **means** responsive to said sensor means **for** causing said first threshold voltage to have a first value in the absence of said predetermined condition, and a second value in response to detection of said predetermined condition;
>
> [claim 11] **means** response (sic) to said sensor means **for** *causing said threshold*[5] *to have a first value in the absence of said predetermined condition, and a second value in response to detection of said predetermined condition*

See APPENDIX A, Master Claim Chart.

---

5. In claim 10 phrase corresponding to claim 11's "said threshold" is "said *first* threshold *voltage*." These phrases mean the identical thing. In claim 11, the omitted word "voltage" is implicit, since "said threshold" refers back to "threshold voltage" in the prior clause F. Similarly, in claim 10, the added word "first" is surplusage, since there is only one threshold voltage mentioned in claim 10, at clause F. Accordingly, claim elements G [10] and G [11] have identical meanings.

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In his deposition, Mr. Carlson conceded that Claim Element G does not recite sufficient structure to perform the stated function. Defendants' Exhibit 49, deposition page 66, line 11 - page 68, line 1. See also, Defendants' Exhibit 50 at page 26.

I agree with Mr. Carlson. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would perform the entire stated function of this claim element. In addition, the structural language of Claim Element G is quite general, and does not allow me to envision a specific structure. Similarly, Claim Element G is far more analogous to examples of claim elements which have been held to have insufficient structure, than to examples of claim elements which have been held to have sufficient structure.

I. Claim Element H ("Light Sensing Means") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element H is as follows:

> light sensing **means** responsive to light external to said apparatus **for** *detecting the presence and absence of daylight*

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson stated that, unlike the other means plus function claim elements, Claim Element H *did* recite sufficient structure to perform the stated function of

claim element H. Defendants' Exhibit 49, deposition page 72, line 2 - page 74, line 9. See also, Defendants' Exhibit 50 at page 27.

I do not agree with him here. The phrase "light sensing" suggests photon detection. There are three basic types of photon detectors: 1) photoconductors, 2) photoemitters, and 3) photovoltaic conductors: See Defendants' Exhibit. 51, Dereniak et al., *Infrared Detectors and Systems*, pp. 86-87. Photon detection involves the concept of converting a photon of light into electrical energy [Id.], and electrical energy is what is required for operation of the circuit of the patent. For purposes of this analysis, I will assume that all three of these photon detectors would be equally useful in the patented circuit. This seems to be what Mr. Carlson was suggesting when he said the structural language of this claim element is sufficient to perform the stated function.

The reason that I disagree with Mr. Carlson's conclusion as to sufficient structure is that, by themselves, none of these photon detectors is sufficient to perform the "entire" stated function which, as I understand Mr. Thesz's statement, is what is specifically required to avoid §1121 6. The structural language of the patent refers to "*light*," whereas the functional language requires "detecting the presence and absence of *daylight*." It seems fair to assume that the terms "light" and "daylight" were intended to mean different things, since they appear in the same claim element. Accordingly, I interpret "daylight" to mean not just "light," but a predetermined quantity of light falling on a unit area of the photon detector at any given moment. By itself, without additional selection circuitry the photon detector has no means for assessing

whether this predetermined condition is met or not. For this reason, in my opinion, the structural language of claim element H is not sufficient to perform the entire function, and thus ought not avoid application of §112 ¶6.

J. Claim Element K(1) ("Means for Causing Lamp to Emit Light at First and Second Levels") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element K(1) is as follows:

> control circuit **means** coupled to said lamp and responsive to said first and second sensor means **for** *causing said lamp to emit light at said first level of illumination in response to said second predetermined condition in the absence of said first predetermined condition, and* **for** *causing said lamp to emit light at said second level of illumination in response to detection of said first predetermined condition*

See APPENDIX A, Master Claim Chart.

In his deposition, Mr. Carlson conceded that Claim Element K(1) recited insufficient structure to perform the stated function. Defendants' Exhibit 49, deposition page 47, line 4 - page 50, line 5.

I agree with Mr. Carlson. There are any number of structures which might meet the structural language recited by this claim element; however, few of those structures would

perform the entire stated function of this claim element. In addition, the structural language of Claim Element K(1) is quite general, and does not allow me to envision a specific structure. Similarly, Claim Element K(1) is far more analogous to examples of claim elements which have been held to have insufficient structure, than to examples of claim elements which have been held to have sufficient structure.

K. Claim Element K(2) ("Means Responsive to Detection of First Predetermined Condition") Recites Insufficient Structure To Avoid Interpretation under §112 ¶ 6.

Claim Element K(2) is as follows:

> wherein said control circuit means includes **means** responsive to detection of said first predetermined condition **for** *initiating measurement of a predetermined time interval, and responsive to expiration of said time interval* **for** *causing said lamp to thereafter emit light at said first level of illumination in response to said second predetermined condition in the absence of a recurrence of said first predetermined condition*

See APPENDIX A, Master Claim Chart.

Mr. Carlson did not construe or comment upon claim element K(2).[6] Assuming that this was an oversight, I will

6. As with elements A and C(1), Mr. Carlson, did not construe or comment upon element K(2). Unlike elements A and C(1), there is not other analogous claim element which Mr. Carlson did construe or comment upon.

state my opinion that this claim element recites insufficient structure to perform its stated function and, therefore, does not avoid interpretation under §112 ¶6. My opinion is based on the fact that there are a vast array of different control circuits which could "respon[d]" to detection of said "first predetermined condition" (i.e. respond to detection of "motion of a person or other object"), some of which would perform the stated function but most of which would not. Such a control circuit need not be used to turn on a lamp from dim to bright for a specified period of time. Instead, it could be used to sound an alarm; open a gate; unlock or lock a door; turn on any electrical appliance such as a coffee pot, radio or heater; activate a surveillance camera, etc. In addition, the structural language of Claim Element K(2) is general, and does not allow me to envision a specific structure. Claim Element K(2) is far more analogous to examples of claim elements which have been held to have insufficient structure, than to examples of claim elements which have been held to have sufficient structure. Accordingly, in my opinion, the claim element K(2) does not recite sufficient structure to perform the stated function. To my knowledge, no Desa witness has expressed an opinion to the contrary.

VI. STRUCTURE WHICH DEFINES THE MEANS PLUS FUNCTION CLAIM ELEMENTS OF CLAIMS 6, 9,10 AND 11.

The following analysis incorporates by reference the Master Claim Chart, Appendix A; Comparison Circuit Diagrams, Appendix B; Claim Key, Appendix C; and Text Key, Appendix D.

Appendix E

A. Structure Defining Claim Element A "Sensor Means"

Claim Element A is as follows:

> sensor means for detecting a predetermined condition external to said apparatus;

The written description of the patent identifies two types of "predetermined condition[s] external to said apparatus."[7]

1. Predetermined Conditions Involving the Photocell.

One "predetermined condition" is the preselected level of light incident upon a photocell (shown in block 56 of '066 Patent Figure 2B) above which the lamp will be "off" (which can be described as "daytime"), and below which the lamp will be "on" (which can be described as "nighttime").

It is important to recognize that the circuit could be designed to switch the lamp "off" as soon as any light falls upon the photocell. However, this is not how the circuit of the patent works. Instead, the circuit does not switch the lamp "off" until the light falling upon the photocell reaches some preselected level e.g. the level at which the circuit designers have decided correspondence to the arrival of "daytime" i.e. the end of "nighttime." This level could be selected to be any level of light between full darkness and full daylight,

7. Here, "said apparatus" refers to the preamble ("An apparatus comprising"), which refers to the assembly of all elements listed in the claim.

depending upon what the circuit designer may wish to accomplish.

In the patent, the "selection circuitry" which selects the preselected level of photocell output current in response to which the circuit will switch the lamp front "on" to "off" a voltage divider consisting of two resistors on either side of the photocell in photocell block 56 of '066 Patent Figure 2B.

2. Predetermined Conditions Involving the PIRs.

The other "predetermined condition" is the preselected level of change in infrared radiation incident upon a pair of PIRs (shown as Q1 and Q 2 in '066 Patent Figure 2A) which will cause the lamp to switch from "on dim" to "on bright."

As with the photocell, it is important to recognize that the circuit could be designed to switch that lamp from "on dim" to "on bright" as soon as the PIRs detect any change in infrared radiation. However, as with the photocell, this is not how the circuit of the patent works. Instead, the circuit does not switch the lamp from "on dim" to "on bright" until the change in infrared radiation detected by the PIRs meets certain preselected conditions e.g. the conditions which the circuit designers have decided correspond to whatever it is they wish to detect.

In the patent, the "selection circuitry" selects the particular preselected PIR output in response to which the circuit will switch the lamp from "on dim" to "on bright."

This "selection circuitry" consists of the "detector" circuit 43, "turn on inhibit" circuit 46, "amplify and filter" circuit 47, "window comparator" circuit 48 and "pulse count" circuit 51.

3. The "Sensor Means" Claim Element A Refers to the PIRs and Their Associated "Selection. Circuitry," But Not to the Photocell and Its Associated "Selection Circuitry."

Once it is understood what is meant by "predetermined condition," we can see that the written description of the patent describes two structures which potentially support the "Sensor Means" claim element A of claims 9, 10 and 11; 1) the photocell and its associated selection circuitry; and 2) the PIRs and their associated selection circuitry.

Nonetheless, in claim 11, claim element A "Sensor Means" cannot be the photocell, with or without its selection circuitry, for several reasons. For one thing, if element A included the photocell, this would duplicate that portion of claim element H "Light Sensing Means" - which provides that the "light sensing means [must be] responsive to light external to said apparatus."

Moreover, in all claims where it appears (claims 9, 10 and 11), if claim element A "Sensor Means" were construed to encompass the predetermined condition of the photocell (nighttime), with or without its selection circuitry, this would be inconsistent with claim element C(1) which provides that the lamp "emit[s] light at said first level of illumination in

the absence of said predetermined condition and . . . emit[s] light at said second level of illumination in response to detection of said predetermined condition. . . ." If this clause were construed to apply to the photocell, the "first level of the illumination" would be "lamp off;" however, this would not satisfy the claim since, when the lamp is off, it does not "emit light" as required by claim element C(1) which appears in each of the claims 9, 10 and 11.

As a result, when construed in accordance with §112 ¶ 6, it is my conclusion that claim element A "Sensor Means" refers to the PIRs and their associated selection circuitry, but not to the photocell and its associated selection circuitry.

The structure which, in my opinion, defines claim element A "Sensor Means" in accordance with §112 ¶ 6 is marked in red on circuit diagram A of Appendix B. The structure which, as understood, Mr. Carlson contends defines this claim element A is marked in blue, also on circuit diagram A.[8]

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8. As to most claim elements, Mr. Carlson has identified the structure which he contends defines the claim element in accordance with §112 ¶ 6 (if applied) in the PowerPoint attached to his written testimony. See Defendants' Exhibit 50. As mentioned earlier, Mr. Carlson's PowerPoint does not provide any definition for claim element A "Sensor Means," although it does provide a definition for claim element I, "First Sensor Means." When this was brought to Mr. Carlson's attention during his deposition, Mr. Carlson said this was an oversight and that he meant to construe claim element A "Sensor Means" of claims 9, 10 and 11 to mean the same thing as "either" the first sensor of claim 6 (which he construes to cover just the PIRs, without their selection circuitry), "or" the second Sensor

(Cont'd)

Appendix E

As shown in Diagram A, the "Massengill" structure encompasses the portion of the '066 Fig. 2 circuit which monitors external infrared radiation, detects changes in infrared energy, and selects those changes that in IR are representative of motion, as manifested by a HIGH or LOW output condition at Node A. See Figure 1 below. Specifically, the output of the selection circuitry associated with the PIRs Q1 and Q2 (labeled Node A) is a signal that is either a HIGH or a LOW voltage — LOW representing the detection of the predetermined condition and HIGH representing the absence of the predetermined condition.

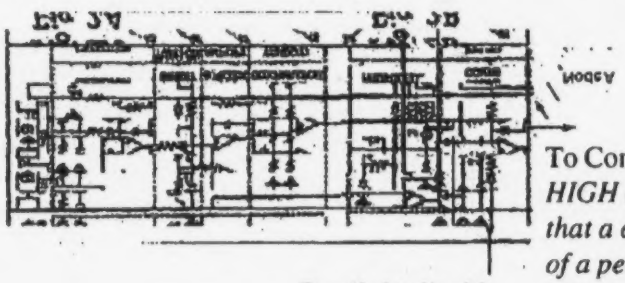

Figure 1. "Massengill" Circuit Structure of Claim Element A

By comparison, also as shown in Diagram A, the "Carlson" structure encompasses only the PIRs Q1 and 02, and the photocell shown in block 56 without any associated selection circuitry for either the PIRs or the photocell.

(Cont'd)

of claim 6 (which he construes to cover just the photocell, without its selection circuitry), "or both." See Defendants' Exhibit 49 [Carlson deposition, page 32, line 19 to page 33, line 9; page 34, lines 13-24.] Circuit diagram A is marked according to this testimony of Mr. Carlson.

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4. The "Carlson" Structure Does Not Define Element A.

a) The Photocell Does Not Define Element A.

I disagree with Mr. Carlson's contention that the structure defining element A includes the photocell for several the reasons. For example, as indicated above, inclusion of the photocell in element A would be inconsistent with claim element C(1) which requires that the lamp "emit light" in response to the presence and absence of the "predetermined condition" whereas, in the absence of the predetermined condition associated with the photocell (nighttime), the lamp *remains* off. In addition, also as indicated above, if element A were to include the photocell, this would duplicate that portion of claim element H "Light Sensing Means" which provides that the "light sensing means [must be] responsive to light external to said apparatus." Even though element H appears only in claim 11, and not in claims 10 and 9, claim element A, which is quite lengthy, is identical in all three claims, which makes it appear that the same meaning is intended for element A in all three claims.

b) The §112 ¶6 Definition Of Element A Must Include Selection Circuitry.

I also disagree with Mr. Carlson's contention that claim element A could include either the PIRs or photocell without including the selection circuitry associated with those components, since neither of these components, by themselves, detect a "predetermined condition."

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Mr. Carlson defines the term "predetermined condition" to have the same meaning in claim 9, 10 and 11 as "first predetermined condition" and "second predetermined condition" in claim 6. Defendants' Exhibit 49 [Carlson deposition, page 32, line 19 - page 33, line 9]. Claim 6 expressly defines "first predetermined condition" to mean "motion relative to said first sensor means of a person or object separate from said apparatus," and "second predetermined condition" to mean "a predetermined level of light external to said apparatus." However, as explained in greater detail below, PIRs detect changes in infrared radiation, not "motion;" and photocells detect light, not "predetermined level[s] of light.

(1) PIR Selection Circuitry Must Be Included.

That PIRs detect changes in infrared radiation, not motion, cannot he seriously disputed. As indicated in my tutorial section above, a PIR sensor consists of an insulator material having a polarity which rapidly switches back and forth by 180° when exposed to changes in infrared radiation, producing a characteristic brief pulse of negative-going then positive-going (or the reverse) electrical voltage or current, as shown in Mr. Raper's oscilloscope trace at the bottom of page 6 of his testimony. This pulse may or may not be caused by the motion of a person or object.

Moreover, in the patented circuit, not all pulses produced by a PIR trigger the lamp. Instead, the selection circuitry only triggers the lamp for those PIR signals which have been preselected by the circuit designer to represent whatever it is that the circuit designer intends the circuit to detect.

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Using my SPICE simulation, I have generated a pair of signal plots which illustrate operation of the PIRs in the circuit of the '066 patent. The first signal plot, marked as Defendants' Exhibit 52 ["Trigger"] illustrates simulated use of the PIRs to turn on the lamp: Here, the top signals (labeled "PIR 1" and "PIR 2") show representative PIR voltages of Q1 and Q2 responsive to external stimuli, as described by Mr. Raper's oscilloscope trace of the "Heimann model LHI-778" PIR. In this simulation, the PIR signals arrive within 2 seconds of each other. The bottom signal plot shows SPICE simulation results of analysis of the '066 patent Fig. 2 circuit in response to those two PIR signals.

The bottom plot in Defendants' Exhibit 52 shows signals at the output of the window comparator ('066 Fig. 2 block 48) and at the output of the pulse count ('066 Fig. 2 block 51) measured at Node A in Fig. 1 above. Note that the HIGH to LOW transition in the pulse counter output (Node A) in response the arrival of the second pulse signifies that predetermined motion has been detected. This LOW signal at Node A then propagates into the logic and lamp control circuitry to cause the appropriate action on the lamp (BRIGHT mode if it is NIGHT).

The other signal plot, marked as Defendants' Exhibit 53 ["No Trigger"], illustrates simulated use of the PIRs to detect a change of infrared radiation that does not turn on the lamp. Here, the top signals (labeled "PIR 1" and "PIR 2") show representative PIR voltages of Q1 and Q2 responsive to external stimuli, as described by Mr. Raper's oscilloscope trace of the "Heimann model LHI-778" PIR. In this simulation, the PIR signals arrive within 4 seconds of each

other. The bottom signal plot shows SPICE simulation results of analysis of the 066 Patent Fig. 2 circuit in response to these two PIR signals. Note that the individual PIR signals in this simulation are IDENTICAL to the previous simulation, however they arrive further apart in time.

In the bottom signal plot of defendants Exhibit 53, we see that the window comparator responds to the PIR signals as indicated by the negative pulses at the output of the comparator ('066 Fig 2 block 48); however, this particular sequence of PIR signals is outside the bounds of what the circuit was designed to interpret as the "first predetermined condition," i.e. "motion . . . of a person or object." Because these PIR signals do not arrive within the preselected time interval, the circuit does not regard them as representing the prescribed "motion." As a result, the pulse counter output (Node A) does not change (is not triggered), and the lamp control circuitry will not respond.

These two simulation experiments show that there are PIR signals in response to IR detection that are "selected" by the '066 Fig. 2 circuitry in blocks 43, 46, 47, 48, and 51 as representative of prescribed motion (the "Trigger" signal plots of Exhibit 52) and other PIR signals in response to ER detection that are NOT "selected" as representative of prescribed motion (the "No Trigger" signal plots of Exhibit 53).

Because of the clear delineation in function between PIRs (which detect changes in infrared radiation) and PIRs with appropriate selection circuitry (which detect motion) I would be surprised to see industry usage referring to PIRs as "motion

detectors." Material collected from various web sites bears this out. Defendants' Exhibit 54 is a collection of product literature for PIRs, which illustrate the PIRs as electrical circuit components and refer to PIRs only as infrared radiation detectors but not motion detectors. On the other hand, Defendants' Exhibit 55 is a collection of product literature for PIR-based motion detectors, which are not circuit components, but completed circuits contained in housings, containing not just PIRs but associated electrical circuitry —a number of which are also said to employ pulse counting.

(2) Photocell Selection Circuitry.

If element A were construed to include a photocell — which it should not be for reasons expressed in section VI. A. 4. a) above — element A must also be defined to include the photocell's associated selection circuitry. As discussed in greater detail elsewhere herein, the presence of the term "predetermined condition" in Element A, as applied to the detection of particular levels of light by a photocell, requires additional circuitry, not just a photocell. Photocells only detect light, whereas selection circuitry is needed to detect a particular level of light.

B. The Structure Defining Claim Element C(1) ("Control Circuit Means")

Claim Element C(1) is as follows:

control circuit **means** coupled to said lamp and responsive to said sensor means **for** *causing said*

Appendix E

lamp to emit light at said first level of illumination in the absence of said predetermined condition, and **for** *causing said lamp to emit light at said second level of illumination in response to detection of said predetermined condition*, wherein said control circuit means is powered by an AC voltages (sic), and

The structure which, in my opinion, defines Claim Element C(1) "Control Circuit Means Responding to First sensor Means and" is marked in read at diagram C(1) of the Comparative Diagrams, Appendix B.

The structure which I have selected is the portion of the '066 Fig. 2 circuit that is connected to the motion selection circuitry and to the lamp, this circuitry performing the function of the logical determination of desired lamp output state (i.e. Dim or Bright) along with the circuitry that implements the lamp state by appropriately gating current to the lamp, as required to perform the function "**causing said lamp to emit light at said first level in the absence of said predetermined condition . . . and at said second level of illumination in response to detection of said predetermined condition . . .**"

As previously noted, Mr. Carlson does not address element C(1); however, I believe this was (as with Element A) unintentional and for purposes of this Statement, will assume that he intended to define Element C(1) the same as K(1), except with the addition of the power supply. Diagram C(1) is marked with a broken blue line indicating the structure which I believe Mr. Carlson intended to define Element C(1).

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As shown by the blue markings in Diagram C(1), the assumed Carlson definition of Element C(1) fails to include the logic circuitry which I believe is necessary to determine "off," "dim," or "bright" operation. The structure I have selected includes that logic circuitry, i.e. the circuit components necessary to establish threshold voltages needed to perform the function of "causing said lamp to emit light at **said first level of illumination . . .** and for causing said lamp to emit light at said **second level of illumination.**"

C. Structure Defining Sub-Element C(2) ("Switching Means").

Claim Element C(2) is as follows:

> wherein said control circuit means includes switching **means for** *selectively permitting and preventing the application of said AC voltage to said lamp*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Sub-Element C(2) "Switching Means" is marked in read at diagram C(2) of Appendix B, Comparative Diagrams.

The structure which I have selected is the portion of the '066 Fig 2 circuit which controls the "on/off" current switching to the lamp. This includes the triac device Q3 and the associated driver pnp transistor and resistors that level-shift the output voltage of the phase angle comparator so that it can properly trigger the triac. Mr. Carlson construes

this element as only the triac device. The triac alone is insufficient to perform the function of "**selectively permitting and preventing the application of said AC voltage**" because the output voltage drive IC2d is insufficient to trigger the triac. The level-shift circuitry included in the structure I have selected is necessary to perform the claim function.

D. Structure Defining Sub-Element C(3) ("Means for Causing Switching Means to Be Actuated")

Claim. Element C(3) is as follows:

> [wherein said control circuit includes] **means for** *causing said switching means to be actuated for a selected portion of each half wave cycle of said AC voltage, said portion of said half waves being greater for said second level of illumination than for said first level of illumination*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Sub-Element C(3) "Switching Means" is marked in red at diagram C(3) of Appendix B, Comparative Diagrams.

There is no difference between Massengill and Carlson construction, so we agree on this structural definition.

Appendix E

E. Structure Defining Sub-Element C(4) ("Means Causing Threshold to Have Third Value").

Claim Element C(4) is as follows:

> [said *control circuit* means including] **means** *responsive to said light sensing means* **for** *causing said threshold voltage to have a third value different from said first and second values when said light sensing means is detecting daylight*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Sub-Element C(4) "Means Causing Threshold to Have Third Value" is marked in red at diagram C(4) of Appendix B, Comparative Diagrams.

The structure Mr. Carlson has selected includes the photocell, voltage divider circuitry, and logic circuitry responsive to daylight. The Carlson construed circuitry generates a digital (yes/no) output and is not capable of generating three threshold voltage values. The structure I have selected includes the Carlson portion (without the photocell and voltage divider, which is captured in Element H below) plus the circuitry necessary to generate the threshold voltages described in the claim element. D14, D15, R34, and R58 are used in a voltage divider arrangement to created three distinct voltage levels (thresholds) at Node 61 and thus are necessary elements to perform the function of the claim element "causing said **threshold voltage to have a third value different from said first and second values** . . ."

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F. Structure Defining Claim Element E ("Means for Producing Ramp Waveform").

Claim Element E is as follows:

> **means for** *producing ramp waveform having for each half wave of said AC voltage a ramp pulse which is initiated in response to detection of the zero crossing point for the half wave*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Element E "Means for Producing Ramp Waveform" is marked in red at diagram E of Appendix B, Comparative Diagrams.

The structure Mr. Carlson has selected includes the ramp-generating elements and the zero-crossing-detect circuit elements. The structure I have selected includes only the ramp-generating circuit elements since the zero-crossing detect function is claimed in the clause "a zero crossing detect circuit for detecting zero crossing points of said AC voltage" immediately preceding element E; therefore, **inclusion of the zero-crossing detect circuitry in element E would be redundant.**

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G. Structure Defining Claim Element G ("Means for Causing Threshold to Have First and Second Values").

Claim Element G is as follows:

> [claim 10] **means** responsive to said sensor means **for** causing said first threshold voltage to have a first value in the absence of said predetermined condition, and a second value in response to detection of said predetermined conditions;
>
> [claim 11] **means** response (sic) to said sensor means **for** *causing said threshold*[9] *to have a first value in the absence of said predetermined condition, and a second value in response to detection of said predetermined conditions*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Element G "Means for Causing Threshold to Have First and Second Values" is marked in red at diagram G of Appendix B, Comparative Diagrams.

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9. In claim 10 phrase corresponding to claim 11's "said threshold" is "said *first* threshold *voltage*." These phrases mean the identical thing. In claim 11, the omitted word "voltage" is implicit, since "said threshold" refers back to "threshold voltage" in the prior clause F. Similarly, in claim 10, the added word "first" is surplusage, since there is only one threshold voltage mentioned in claim 10, at clause F. Accordingly, claim elements G[claim 10] and G [claim 11] have identical meanings.

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The structure Mr. Carlson has selected encompasses the window comparator circuit. The structure I have selected encompasses the circuitry necessary to respond to the HIGH/LOW decision of the motion selection circuitry (Node A) and generate a corresponding voltage (threshold) at Node 61. This structure is necessary to perform the function "causing said **threshold voltage** to have a first value . . . and a second value. . . ," which only occurs in the '066 Fig 2 circuit at Node 61.

H. Structure Defining Claim Element H ("Light Sensing Means").

Claim Element H is as follows:

> light sensing **means** responsive to light external to said apparatus **for** *detecting the presence and absence of daylight*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Element H "Light Sensing Means" is marked in red at diagram H of Appendix B, Comparative Diagrams.

The structure Mr. Carlson has selected includes only the photocell light-sensitive device. The structure I have selected includes the photocell as well as the resistors necessary to form a voltage-divider circuit that can be tuned (by the designer) to output an appropriate HIGH or LOW voltage representative of daylight versus nighttime, respectively. The voltage-divider structure is necessary to perform the function "presence and absence of **daylight**."

Appendix E

I. Structure Defining Claim Element I ("First Sensor Means").

Claim Element I, which appears only in claim 6, is as follows:

> first sensor **means for** *detecting a first predetermined condition external to said apparatus, said first predetermined condition being motion relative to said first sensor means of a person or an object separate from said apparatus.*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Element I "First Sensor Means" is marked in read at diagram I of Appendix B, Comparative Diagrams.

The structure Mr. Carlson has selected includes only the PIR sensor devices, which will respond to infrared radiation but have no ability to selectively distinguish motion. The structure I have selected includes the portions of the '066 Fig 2 circuit which monitors external infrared radiation, detects changes in infrared energy, and selects those changes in IR that are representative of motion, as manifested by a HIGH or LOW output condition at Node A. This structure is necessary to perform the function "predetermined condition being **motion . . . of a person or object**".

Appendix E

J. Structure Defining Claim Element J ("Second Sensor Means")

Claim Element J, which also appears only in claim 6, is as follows:

> Second sensor **means for** *detecting a second predetermined condition, said second predetermined condition being a predetermined level of light external to said apparatus*

See APPENDIX A, Master Claim Chart.

The structure which, in my opinion, defines Claim Element J "Second Sensor Means" is marked in red at diagram J of Appendix B, Comparative Diagrams.

The structure Mr. Carlson has selected includes only the photocell light-sensitive device. The structure I have selected includes the photocell as well as the resistors necessary to form a voltage-divider circuit that can be tuned (by the designer) to output an appropriate HIGH or LOW voltage representative of daylight versus nighttime, respectively. The voltage-divider structure is necessary to perform the function "**predetermined level of light**."

K. Structure Defining Claim Element K(1) ("Control Circuit Means")

Claim Element K(1), which appears only in claim 6, is as follows:

> control circuit **means** coupled to said lamp and responsive to said first and second sensor means

> **for** *causing said lamp to emit light at said first* **level** *of illumination in response to said second predetermined condition in the absence of said first predetermined condition,* and **for** *causing said lamp to emit light at said second level of illumination in response to detection of said first predetermined condition,*

The structure which, in my opinion, defines claim element K(1) is marked in red at diagram K(1) of Appendix B, Comparative Diagrams.

The structure which Mr. Carlson has selected fails to include the logic circuitry which I believe is necessary to determine "off," "dim" or "bright" operation. The structure which I have selected includes that logic circuitry, includes circuit components necessary to establish threshold voltages needed to perform the function of "causing said lamp to emit light at *said first level of illumination* . . . and for causing said lamp to emit light at said *second level of illumination.*"

L. Structure Defining Claim Sub-Element K(2) ("Means Responsive to Detection of First Predetermined Condition").

Claim Element K(2) is as follows:

> wherein said control circuit means includes **means** responsive to detection of said first predetermined condition **for** *initiating measurement of a predetermined time interval, and responsive to expiration of said time interval* **for** *causing said*

lamp to thereafter emit light at said first level of illumination in response to said second predetermined condition in the absence of a recurrence of said first predetermined condition

The structure which, in my opinion, defines claim element K(2) is marked in red at diagram K(2) of Appendix B, Comparative Diagrams.

Mr. Carlson has selected the same structure. Accordingly Mr. Carlson and I agree with regard to which structure defines claim element K(2).

M. Alternatively, If The Sensor Means Claim Elements A and I Were Construed To Not Include The Pulse Counting Selection Circuitry, Pulse Counting Would Be Part Of The Control Circuit Means Claim Elements C(1) and K(1).

In its Markman briefs, Desa has contended that the pulse counting circuitry of the '066 patent is part of the "control circuit," rather than part of the detection circuitry defined by claim elements A and I of the asserted claims 6, 9, 10 and 11 because pulse counting is expressly called out as a part of the control means in non-asserted claim 12. Moreover, Desa contends that, because pulse counting is expressly called out as part of the control circuit means in claim 12, the legal doctrine of "claim differentiation" precludes it from being included as part of the control circuit means elements of claims 6, 9, 10 and 11. I have been asked to consider and comment upon these two contentions by Desa.

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As to Desa's first contention, it seems odd to me the patent claims would call out pulse counting as part of the control circuit, in view of the way that the schematic diagram in Figure 2 of the patent is presented. Circuit designers often arrange schematic diagrams in a logical way that mimics the high-level functional topology of a design (especially when "teaching" or presenting a design to others). When I read the claims of this patent, and then study the schematic diagram, I see parallelism between the functional structure of the claims and the graphic layout of the schematic:

The claims describe (broadly speaking from a circuit design perspective) the design functions of detecting one or two predetermined conditions (e.g., motion and/or daylight), performing some logic to choose a mode for the lamp (e.g. off, dim, bright) based on a combination of detected events, and then implementing that mode with appropriate lamp control circuitry. These three functional divisions seem to be purposefully captured in the schematic diagram.

In the schematic, the detection/selection circuitry is set out in the top row of circuit blocks, the logic circuitry is set out in the middle row of circuit blocks (perhaps including the timer (block 52) above), and all of the lamp modulation and override control circuitry is set out in the bottom row of circuit blocks. I think this would be apparent to any electrical engineer. The pulse counting circuit is located in the upper row along with the rest of the detection/selection circuitry (including the photocell circuitry of block 56), which suggests that this was exactly the functional arrangement intended by the designers, and that inclusion of pulse counting in the control circuit means claim element of claim 12 is an

anomaly, and that it belongs in the sensor means element instead. As advised, the '066 patent file history shows that neither claim 12 nor any other claim element expressly limited to pulse counting were was included among the original claims when the patent application was filed. Claim 12 was only added by new attorneys in a new law fine after the filing was complete. Perhaps this was the source of what otherwise seems to me to be a fairly obvious error in claim 12.

As to Desa's second contention — that pulse counting cannot be part of the control circuit means of claims 6, 9, 10 and 11 by operation of §112 ¶ 6 because pulse counting is expressly called out as a limitation of the control circuit means in claim 12 — I wish to point out that the mere existence of claim 3 among the '066 patent claims is *entirely inconsistent* with this contention. Claim 3 is as follows: "An apparatus according to claim 1, wherein said *sensor means includes a passive infrared detector*." If Desa's contention is correct as to claim 12, then the "first sensor means" claim element of claim 11 — which is defined as "means for detecting . . . motion relative to said first sensor means of a person or an object . . ." — would not include a PIR. This would be logically impossible since a passive infrared detector is the only sensor which the patent discloses as part of the means for detecting motion.

Moreover, if claim differentiation were a compelling argument for excluding pulse counting from the control circuit means elements of claims 6, 9, 10 and 11, the existence of claim 3 among the '066 patent claims would provide an even more a compelling argument against Mr. Carlson's

contention that the sensor means claim elements do not include the selection circuitry associated with the sensors. Unlike claim 12, if the first sensor means of claim 1 did not include the PIR selection circuitry, claim 3 would be wholly redundant of claim 1.

Further, as advised, the '066 patent file history shows that claim 3 was among the claims filed with the original '066 patent application. The logical inconsistency between the existence of claim 3 in the patent, and inclusion of pulse counting as part of the control circuit means in claim 12, underscores the likelihood that the latter was an error.

In addition, with regard to Desa's "claim differentiation" argument, I also note that the language of the primary control circuit means claim elements; C(1) and K(1), are broadly limited to the function of causing the lamp to emit bright light when the [first] predetermined condition is detected, and to emit dim light when the [first] predetermined condition is absent. All of the subsequent control circuit claim elements, C(2)-C(4) and K(2), are subordinate to primary elements C(2) and K(2); and those subordinate claim elements are all qualified by the phrase "wherein said control circuit means *includes*." By the same token, the stated functions of the subordinate control circuit claim elements are subordinate to the main function of causing the lamp to emit bright light when the [first] predetermined condition is detected, and to emit dim light when the [first] predetermined condition is absent. As a result, it cannot be said that the express provision of the subordinate claim elements C(2)-C(4) and K(2) in the claims necessarily excludes any one or more of those subordinate elements in the primary claim elements C(1) and

K(1). In fact, as a matter of grammar, the recitation of specific things included in a general category usually only makes it clear that the general category encompasses at least those specific things and possibly others — not that other mentions of the general category necessarily exclude those specific things.

In any event, I note that Mr. Thesz is of the opinion that, by filing the McCavit declaration in the Patent Office to distinguish its claims from the Nippon Ceramic prior art, any interpretation of the patent claims that does not require pulse counting has been disclaimed. This would be a further reason to conclude that, if pulse counting is not included as a limitation of the sensor means claim elements A and I, it would be included as a limitation of the primary control circuit means claim elements C(1) and K(1).

Date: April 12, 2005 Lloyd W. Massengill

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APPENDIX F — ORDER OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT DENYING PETITION FOR REHEARING FILED FEBRUARY 1, 2007

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

06-1168

DESA IP, LLC,

Plaintiff-Appellant,

v.

EML TECHNOLOGIES, LLC and COSTCO WHOLESALE CORPORATION,

Defendants-Appellees.

ORDER

Before Michel, Chief Judge, Plager, Senior Circuit Judge, and Rader, Circuit Judge.

A petition for rehearing having been filed by Appellees,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED.

Appendix F

The mandate of the court will issue on February 8, 2007.

FOR THE COURT,

s/ Jan Horbaly
JAN HORBALY
Clerk

Dated: 02/01/2007